GARDNER ON THE NAVELS OF EDEN • BIBLE CODE FOLLOW-UP • CORSO'S *THE DAY AFTER ROSWELL*

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

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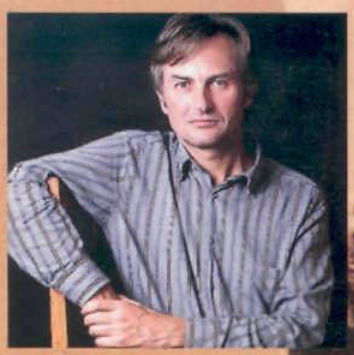

Science, Delusion, and the Appetite for Wonder

Richard Dawkins

A Mind at Play

An Interview with

Martin Gardner

Houdini and Conan Doyle

The Story of a Strange Friendship

Spontaneous Human Combustion

SPECIAL REPORT

The Price of Bad Memories

Published by the Committee for the Scientific Investigation of Claims of the Paranormal

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AT THE CENTER FOR INQUIRY–INTERNATIONAL (ADJACENT TO THE STATE UNIVERSITY OF NEW YORK AT BUFFALO)

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On the Cover: Harry Houdini in chains, c. 1899. (Library of Congress, McManus-Young Collection)

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Science runs the gamut from the tantalizingly surprising to the deeply strange. It is well qualified to feed our human need for wonder and mystery.

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An Interview with Martin Gardner

At age eighty-three, polymath Martin Gardner still delights in learning something new and, luckily for us, in sharing it with others. In this SI interview, Gardner, one of the most highly regarded intellects of the twentieth century and scourge of pseudoscientists, shares his thoughts on philosophy, mathematics, magic, religion, science, and fringe-science.

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The Story of a Strange Friendship

The fascinating tale of the Magician and the Knight. They were both profoundly attracted by spiritualism, and yet their opinions were completely opposed.

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Thoughts of a Forensic Biologist

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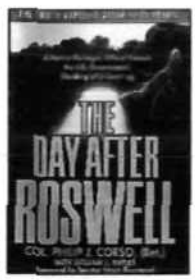

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EDITOR'S NOTE

Scientific Wonders and Burning Issues

What do we know that Aristotle couldn't? How do we know what will still be true in a future Aristotle's time? What's the value of quarks? Why do some think science is dull and plodding when—as history shows over and over—it changes the world? Does understanding detract from beauty? (Does science unweave rainbows?) Is science a fit subject for poetry? (Wordsworth thought so.) Is science just organized common sense or counterintuitive and surprising paradox? Or both? Why does television present so much paranormal propaganda? How is it that our DNA is a coded description not just of ourselves but of ancient times?

The fertile mind of Richard Dawkins ranges over these and countless other questions in "Science, Delusions, and the Appetite for Wonder," in this issue. A CSICOP Fellow and author of such books as *The Blind Watchmaker*, *River Out of Eden*, and *Climbing Mount Improbable* (and of an earlier article, "Putting Away Childish Things," in our January/February 1995 issue), Dawkins has a special ability to write clearly about deep matters and to invoke the awe of science.

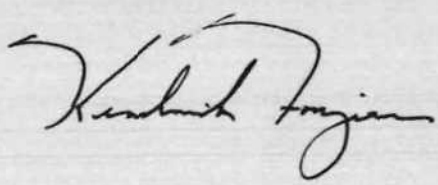
Another luminary long familiar to our readers, Martin Gardner, in a wide-ranging interview I titled "A Mind at Play," overcomes his natural reclusiveness to talk about himself and his delights—as well as about the big issues that concern him. Martin founded the modern skeptical movement with his 1952 classic *Fads and Fallacies in the Name of Science* and its sequels, entertained and informed generations of scientists with his three decades of *Scientific American* recreational mathematics columns, helped found CSICOP in 1976, and has written his "Notes of a Fringe-Watcher" column for every issue of the *Skeptical Inquirer* since Summer 1983.

One of the strangest friendships among noteworthy people of the century is chronicled in Massimo Polidoro's article on Houdini and Arthur Conan Doyle. Houdini, the magician, arch-rationalist, and skeptical investigator of psychic claims, and Conan Doyle, a gullible believer in the psychic powers of mediums and the reality of the Cottingley Fairies (despite his creation of the logical Sherlock Holmes), enjoyed each other's company and found common interest in investigating the paranormal—until their contradictory viewpoints strained the relationship to the breaking.

And we have two reports on one of those strange burning issues that so delight paranormalists: spontaneous human combustion. Forensic biologist Mark Benecke shows why there is no need to resort to bizarre explanations to account for the observed facts. With his article, we also publish some photographs that are quite graphic. But Benecke is a forensic investigator, and given his clinical approach and the context of the subject matter, they seem appropriate. Then in his Investigative Files column, CSICOP Senior Research Fellow Joe Nickell, a former private investigator who himself has carried out numerous forensic investigations, devotes his attention to other cases of alleged spontaneous human combustion and provides further demystification of a smoldering topic.

* * *

Notice something different about the look and feel of this issue? First, we are pleased to report that beginning with this bimonthly issue we are adding four more pages to each issue so that we can provide you with more material. Second, our pages are now printed on a coated paper stock that should improve readability and appearance. We hope you like it. As always, we value your comments.



Skeptical Inquirer

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Two Views on Acupuncture: NIH and SRAM Dispute Validity, Efficacy

In November, the National Institutes of Health (NIH) issued a statement of a consensus-development conference on acupuncture. The statement was widely reported in the news media and generally interpreted as providing new scientific legitimacy to at least certain aspects of acupuncture. Below we print the Conclusions and Recommendations section of the eighteen-page NIH report (the full report can be found on the World Wide Web at http://consensus.nih.gov) followed by a statement responding to it from the editors of the new Scientific Review of Alternative Medicine.

This is the Conclusions and Recommendations section of the NIH Consensus Development Conference Statement, "Acupuncture," November 3–5, 1997:

Acupuncture as a therapeutic intervention is widely practiced in the United States. There have been many studies of its potential usefulness. However, many of these studies provide equivocal results because of design, sample size, and other factors. The issue is further complicated by inherent difficulties in the use of appropriate controls, such as placebo and sham acunpuncture groups.

However, promising results have emerged, for example, efficacy of acupuncture in adult post-operative and chemotherapy nausea and vomiting and in post-operative dental pain. There are other situations such as addiction, stroke rehabilitation, headache, menstrual cramps, tennis elbow, fibromyalgia myofascial pain, osteoarthritis, low back pain, carpal tunnel syndrome, and asthma where acupuncture may be useful as an adjunct treatment or an acceptable alternative or be included in a comprehensive management program. Further research is likely to uncover additional areas where acupuncture interventions will be useful.

Findings from basic research have begun to elucidate the mechanisms of action of acupuncture, including the release of opioids and other peptides in the central nervous system and the periphery and changes in neuroendocrine function. Although much needs to be accomplished, the emergence of plausible mechanisms for the therapeutic effects of acupuncture is encouraging.

The introduction of acupuncture into the choice of treatment modalities that are readily available to the public is in its early stages. Issues of training, licensure, and reimbursement remain to be clarified. There is sufficient evidence, however, of acupuncture's value to expand its use into conventional medicine and to encourage further studies of its physiology and clinical value.

What follows is the statement issued November 10 by the editors of the Scientific Review of Alternative Medicine:

Scientists and Physicians Condemn NIH Endorsement of Acupuncture

Leading physicians and scientists, all editors of the *Scientific Review of Alternative Medicine* (*SRAM*), dispute the National Institutes of Health's (NIH) endorsement of acupuncture as a treatment for pain and other conditions. "Acupuncture is an unproven treatment. The best studies of acupuncture show that it is no more effective than placebos (inactive treatments). The NIH panel was conceived in all likelihood with an agenda to promote the acceptance of acupuncture by the public, press, insurance plans, HMOs, and federal and state medical plans," says Dr. Wallace Sampson, M.D., Editor of *SRAM* and Clinical Professor of Medicine at Stanford University.

On November 6, the NIH Consensus Development Conference concluded that "[t]here is sufficient evidence . . . of acupuncture's value to expand its use into conventional medicine and to encourage further studies of its physiology and clinical value." The panel also suggested that the federal government and insurance companies expand coverage of acupuncture to allow more people access to treatment.

The NIH Consensus panel is the offspring of the NIH's Office of Alternative Medicine (OAM). The OAM was started by the NIH in 1992 to evaluate alternative treatments and to provide information on unconventional healthcare services. But since its formation, it has come under harsh criticism for its bias. "The 'consensus' was a consensus of proponents, not a consensus of valid scientific opinion. The presentation of acupuncture for the conditions suggested by the conference is classic pseudoscience. It showed the promoters as ideologically motivated instead of scientifically objective," says Sampson.

"It is outrageous to suggest that insurance premiums rise in order to provide for acupuncture visits. These conclusions do not fit with science, rather they reflect the bias of the NIH panelists who were selected by a planning committee dominated by acupuncture proponents," says Dr. Stephen Barrett, M.D., Contributing Editor to *SRAM* and head of Quackwatch, Inc.

Answers to the reported success of acupuncture can be found in human psychology. "Perceived effects of acupuncture are probably due to a combination of expectation, suggestion, counter-irritation, conditioning, and other psychological mechanisms," says Barrett. The confounding influence of these psychological mechanism, creates a number of experimental difficulties in accurately evaluating acupuncture's effectiveness. Few studies have satisfied control requirements, leaving supportive scientific evidence insufficient or nonexistent.

"It is easy to reach a consensus when dissenters are systematically excluded from the discussion. At this point I

would have to say that the consensus report is seriously flawed because contrary and cautionary voices were not heard," says Barry Beyerstein, Ph.D., Professor of Psychology at Simon Fraser University, British Columbia.

Traditionally acupuncture has been based on the premise that there are patterns of energy flow (*Qi*) through the body that are essential for health. Disruptions of this flow are believed to be responsible for disease. The acupuncturist can supposedly correct imbalances of flow at identifiable points close to the skin. However, despite considerable efforts to understand the anatomy and physiology of the "acupuncture points," the definition and characterization of these points remains controversial. Even more elusive is the scientific basis of some of the key traditional Eastern medical concepts such as the circulation of *Qi*, the meridian system, and the five phases theory, which are difficult to reconcile with contemporary biomedical information but continue to play an important role in the evaluation of patients and the formulation of treatment in acupuncture.

Concludes Sampson: "The report states that '[t]he data in support of acupuncture are as strong as those for many accepted Western [. . .] medical therapies.' The 'consensus' stretches the point to unacceptable conclusion. When consensus conferences are held at the NIH on controversial methods with as little evidence for them that acupuncture has, the usual scientific response is to recommend against use of those methods, not to approve and adopt them."

* * *

Those weren't the only criticisms. "There really aren't any good studies," said John Loeser, director of the Multidisciplinary Pain Center at the University of Washington at Seattle. Allan Basbaum, a pain researcher at the University of California at San Francisco agreed: "I don't find the evidence compelling that it's any different than a placebo" (*New Scientist*, November 15).

"It was a conference of believers [who] recited their delusions as fact," said Victor Herbert, professor of medicine at the Mount Sinai School of Medicine in New York. He dismissed acupuncture as "pseudo-religious cultism" (*Nature*, November 13).

The organizers of the conference nevertheless vigorously defended the panel and the process as fair.

To read the National Council Against Health Fraud's position paper on acupuncture, visit the Web site for Quackwatch Inc. at http://www.quackwatch.com/acu.html.

For more information about the Scientific Review of Alternative Medicine *call 1-800-421-0351.*

32 Sandia Scientists Sign Statement on Validity of Earth Dating

Scientists' sensitivities were rubbed particularly raw when a reader, steeped in creationism and upset about an earlier article by *Albuquerque Journal* science reporter John Fleck ("N.M.'s Rocks Hold Clues to Earth's Age"), published a critical letter to the editor in the newspaper's November 3 issue. Referring to Bishop Ussher's proclamation that the Earth was six thousand years old, the letter writer asserted that "many top scientists agree with Ussher, including many of the top scientists at Sandia Labs."

Sandia National Laboratories, based in Albuquerque, is one of the nation's largest R&D facilities. A U.S. Department of Energy national laboratory with major missions in national security, Sandia advances the frontiers of technology in physics and chemistry, supercomputing and computational science, intelligent machines and robotics, microelectronics, materials science, and a host of other scientific and engineering fields. Sandia scientists have worked toward the long-term disposal of nuclear waste in stable geologic repositories, simulated hypervelocity impacts into the Earth and other planets, and have been instrumental in other projects in the earth and geophysical sciences. Sandia's workforce of 7,540 includes 1,350 technical staff members with Ph.Ds. In addition to their research, many Sandia scientists have helped to advance science education, including serving as part-time "science advisors" in New Mexico schools.

Sandia physicist Mark Boslough, one of many Sandians who has promoted stronger science education standards for the state's schools, drafted a letter of response and circulated it to colleagues at Sandia. The letter was carefully phrased to assert an unassailable pro-scientific position and narrowly focused not to raise side issues. On November 26, their letter appeared in the *Albuquerque Journal*. It was signed by thirty-two Sandia scientists, including Boslough and Rick Buss, a principal member of the technical staff.

Consensus at Sandia Behind Radiometrics

Re: "Geological Clues or Red Herring?" letter by John Woffard—

Woffard incorrectly stated that many of the top scientists at Sandia Labs agree with Bishop Ussher's 17th century proclamation that the Earth is approximately 6,000 years old.

On the contrary, Sandia has contributed to the body of modern research that supports the Earth's true age of about 4.5 billion years. Some Sandia programs make use of the same reliable radiometric dating techniques that tell us how old our planet is.

We think that any Sandia scientist among us who really believes that he or she has a sound technical argument against these methods, and for a young Earth, would surely present a seminar or try to publish an internal report before testifying at a school board meeting.

To our knowledge, this has never happened at Sandia. We suspect that it never will, regardless of what our children are taught in school.

It has been a particular concern and

embarrassment to many Sandians—not just its scientists but nonscientist members of the laboratory staff and some in upper management—that the positive scientific and educational activities of Sandia Labs' scientists sometimes get overshadowed by the actions of two members of Sandia's technical staff who are active creationists. One, Russell Humphreys, is a member of the Institute for Creation Research (ICR) and is very active both locally and nationally; the other quotes ICR teachings and is an appointed member of the State Board of Education. Both often make public statements on behalf of anti-evolution, pro-creationist viewpoints and are frequently quoted in the news in that regard.

The two have actively challenged draft science-teaching standards that include evolution. Their opposition has helped remove evolution and evidence about the ancient age of Earth from standards for teaching science in New Mexico schools and has sidetracked efforts to bring these subjects back (see "'Evolution' Loses Out in New Mexico Science Standards," *SI*, November/December 1996, pp. 8–9). As an alternative they offer "intelligent design theory"—essentially a euphemism for special creation—something that both scientists and creationists agree is a way to get creationism into the classroom. Seldom is it indicated that they are offering their personal views, not the scientific position of the laboratory. Seldom is it mentioned that their views are not based in any way on work they have done, or even presented for peer review, at the laboratory. Such peer review is a standard procedure that scientists are expected to follow at Sandia just as everywhere else.

Following publication of the Sandia scientists' letter, Russell Humphreys published a response in the *Albuquerque Journal*. Writing as though the collective letter had been from only one person (Buss) and not from thirty-two fellow Sandia scientists, Humphreys alleged (incorrectly) that Buss's opposition was based on ignorance of the young-Earth arguments. He also said his own effort years ago to present a Sandia colloquium on his creationist views had been vetoed by a Sandia executive vice president.

Boslough responded with a letter published January 8, 1998. He said Sandia scientists' consensus acceptance of radiometric dating is based not on faith, as Humphreys had implied, but on "rigorous theory, laboratory testing, and independent field confirmation."

Boslough re-emphasized the total absence of any peer-reviewed scientific work by Humphreys in support of his young-Earth views:

> According to a Sandia database, Humphreys has never even attempted to publish any evidence contrary to the prevailing views on radiometric dating. A logical conclusion is that he doesn't really believe he has a sound technical argument. Humphreys himself recently responded to an e-mail query by admitting that he had not published his rejection of radiometric dating methods because he had not even analyzed them.
>
> Humphreys has never been able to provide a citation to any scientific literature supporting his view, nor has he been able to come up with the name of a single other Sandia scientist who believes the Earth is 6,000 years old.

Boslough ended by reiterating the crucial importance of peer review and its absence in this case. He criticized "the ease by which the popular press allows him [Humphreys] to bypass the peer-review process normally required by Sandia to protect taxpayers from shoddy research. It would be wise to question any claim by a scientist who published it only in newspaper letters and presents it only at school board meetings."

The published statement signed by thirty-two scientists has general significance in the evolution/creationism educational controversy nationally as well as in New Mexico. The scientists who signed it say they hope it will dispel any impression that Sandia National Laboratories advocates anything other than scientifically supported evidence about the Earth's age and history.

—Kendrick Frazier and Christopher K. Frazier

Kendrick Frazier is editor of the SKEPTICAL INQUIRER. *Chris Frazier is in the Department of Biology at the University of New Mexico.*

A Victory in Australia: Creation Science Foundation Removes 'Science' from Name

The Australian Skeptics are celebrating a tactical victory over the main creationist propaganda organization in Australia.

The Queensland-based Creation Science Foundation (CSF), which has, for approximately twenty years, spearheaded the promotion of the anti-scientific dogma of creation "science" in Australian schools, announced in November that, henceforth, the organization will trade under the name Answers in Genesis (AIG).

By removing any reference to science from its title, and by adopting its new name, the group is finally acknowledging what the Australian Skeptics have always maintained, that the organization represents only a peculiarly narrow fundamentalist religious dogma, which has nothing whatever to do with science.

AIG, announcing its conversion to a more honest title in its publication *Prayer News* (November 1997), claimed that its U.S. offshoot, the Kentucky-based Answers in Genesis, set up by former CSF director Ken Ham, has had success under the new name and that all of their associated "ministries" would now use this title. In what was no doubt unconscious irony, it also claimed that the new name will be "less easily confused, even unconsciously, with cultic groups like 'Christian Science' and

'Scientology.'"

The Australian Skeptics, while regarding this belated change as a tactical victory, said they will nevertheless maintain their vigilance and opposition to any future attempts by the creationist minority, under whatever name, to seek to inject intellectually barren dogma into school curricula.

They also expect that this move will stimulate some more vigorous opposition to the creationist propaganda from Australia's mainstream religions, now that they are being directly challenged on their own turf.

—Barry Williams

Barry Williams is the executive officer of the Australian Skeptics.

State Attorney General Targets 'Psychic' Gadget Fraud

The Attorney General of New Mexico, Tom Udall, filed an eleven-count civil lawsuit against an Albuquerque firm that claimed its products could detect ghosts and speak to animals. The lawsuit, filed on November 6, 1997, claims that John J. Williams and Laurencia Williams, under the company name Consumertronics, Inc., intentionally misrepresented their devices and that Williams misrepresented himself as a former weapons engineer and physicist.

One of the Consumertronics devices was a "Sixth Sense Communicator," which supposedly facilitated communication with animals, psychic healing, séances, and "sexual stimulation," or it could simply function as a "conversation piece," according to the advertising. Another device, an "Ultra-Sensitive Unknown Presence Detector," was touted to detect ghosts and spirits.

A retired University of New Mexico electrical engineering professor examined the devices at Udall's request and found the items worthless and nonfunctional. Most were simply videocassette boxes containing a plastic board that looked like a circuit board and some wiring. The item sold for $395. Udall asked the court to return money from consumers and bar further sales of the devices, and to impose civil penalties of $5,000 per incident. The number of victims is unknown, but the state District Court will decide how many misrepresentations were made. A federal racketeering law allows the Attorney General to seek treble damages.

—Benjamin Radford

Benjamin Radford is a writer in Corrales, New Mexico.

Survey Finds 70% of Women, 48% of Men Believe in Paranormal

A newspaper survey of readers of Great Britain's *Daily Telegraph* revealed that nearly 60 percent of 6,238 respondents believed in the paranormal. Of the women sampled, 70 percent believed in paranormal, compared with 48 percent of the men. The survey tested but found no evidence to support the theory that misjudgments of probability are greater among believers than nonbelievers.

The study, published recently in the *British Journal of Psychology* (88 [1997]: 683–689), was part of British Science and Technology Week in March 1994. The author of the study was psychologist Susan J. Blackmore of the University of the West of England. She says it is by far the largest study ever conducted on probability misjudgment.

A questionnaire was published in the *Daily Telegraph*, listing ten statements of the kind that might be produced by psychics, such as "There is someone called Jack in my family" or "Last night I dreamed of someone I hadn't seen for many years." Respondents were first asked if the statements were true of them, and then if they believed that the same statements would be true of the average person. Then they were asked to estimate how likely it was that a given number of the statements would apply to the average person. Lastly, the respondents were asked their age, gender, and whether they believed in extrasensory perception.

One reason for the study was to test the theory of probability misjudgment—the theory that believers in the paranormal are likely to show worse probability judgments and greater underestimates of chance coincidences than nonbelievers. Probability misjudgment theory predicts that believers will ascribe unusual events as miraculous or paranormal, when they are simply unusual or unlikely. The theory also suggests that clients of psychics underestimate the chance that something that is true for them is also true for others (and hence can be easily guessed by the psychic) and underestimate the chance of several guesses simultaneously being true.

Probability misjudgment theory was, in fact, not supported by the survey. Probability estimates of respondents were generally good and did not differentiate between believers and nonbelievers. This finding, in so large a sample, suggests that misjudgments of probability are not likely to be an important factor in the determination of paranormal beliefs.

Believers reported far more of the statements true for themselves than did nonbelievers. Why this would be so is uncertain; possibly there are real lifestyle differences between the groups, or perhaps the believers simply used more inclusive categories when answering the questions, therefore garnering more positive responses.

In general, the percentage of "true for me" responses for the individual statements was quite high, as high as 37 percent for one statement. As Blackmore notes, "You might easily be impressed if a psychic correctly told you the name of a specific piece of music you owned. However, nearly 30 percent owned the

music chosen here (Handel's *Water Music*). And 21 percent had a Jack in their family. Clients are often impressed by accurate names given, even when these are fairly common names. This figure suggests that a correct name might quite easily be obtained with relatively little probing."

While the sample was not random, it was the largest of its kind taken to date. A survey taken in 1973 by Christopher Evans and published in *New Scientist* found that 67 percent of the respondents thought ESP was likely or certain to exist, compared with 59 percent in Blackmore's study. As both surveys were published in magazines or periodicals, the respondents were self-selected and nonrandom, and therefore the results cannot be generalized to the whole population.

—*Benjamin Radford*

Everyone's a Critic: 'Houdini' Gives Play Thumbs Down

The anniversary of the death of Ehrich Weiss, better known as Harry Houdini, has once again passed without any contact from the other side. Most know that Houdini and his wife had agreed that whoever died first would attempt to contact the survivor. Houdini joined the choir invisible on October 31, 1926, and his wife began the wait for a secret message the two had agreed upon and that only she, Houdini, and Houdini's brother knew. She never heard that message and declared before her death in 1943 that the experiment had been a failure.

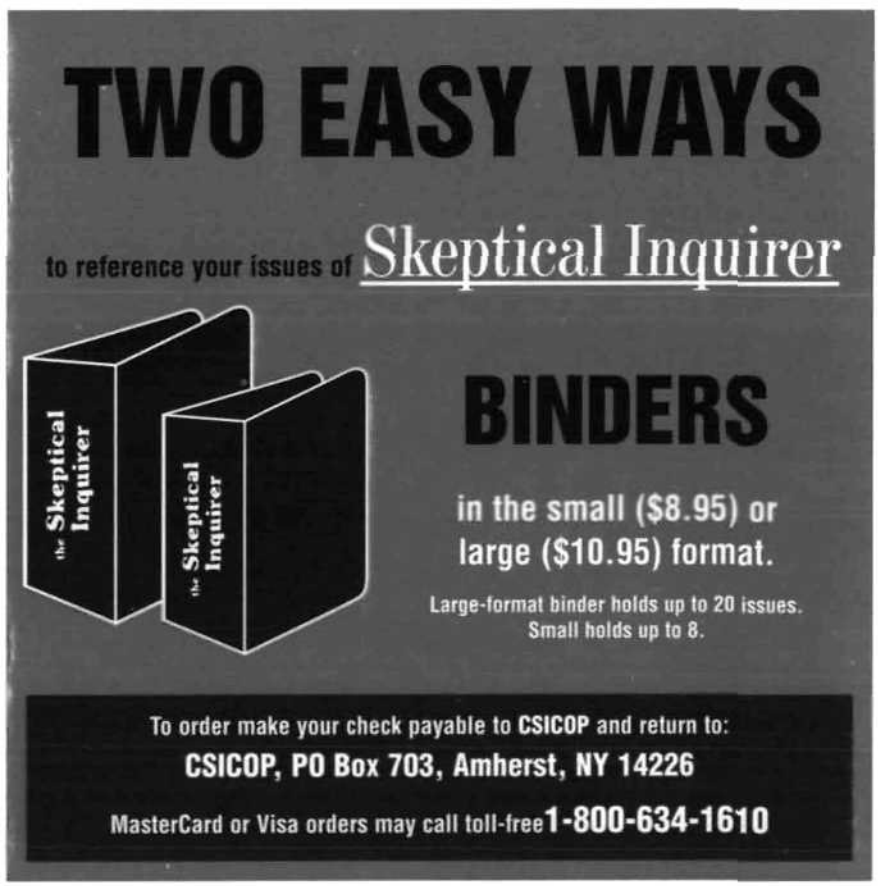
Since his wife's death, every year on October 31, others have attempted to contact Houdini, alas without any demonstrable success. The attempt last year had a special significance in Connecticut, where a musical play about Houdini's life was in a pre-Broadway run at the Goodspeed Opera House in East Haddam. The show had received mediocre reviews and, perhaps in an attempt to boost public interest, the "Official Houdini Séance" was held in the theater at midnight after the October 31 performance. The goal, of course, was to contact the great magician.

The séance was conducted by medium Elaine Kuzmeskus. Also present was a local Connecticut psychic, Barbara Dryden-Masse. After some preliminaries, Kuzmeskus informed the packed theatre that Houdini was, in fact, in attendance. Remarkably, Houdini's memory and famed magical abilities have faded on the other side. According to a report in the *Hartford Courant* ("Houdini Eludes Psychic at Séance," November 1, 1997), Houdini did not recognize the names of people important in his life as relayed to him through the medium and psychic, nor could he discern the contents of a sealed envelope supplied by Houdini historian Larry Weeks.

Houdini, however, was not silent. He did relay at least one message. Certainly, it is interesting to know what Houdini, dead now for seventy-one years, felt was most important to convey in this first "successful" contact from the other side. Did Houdini describe the afterlife, or did he share his experience of the mind of God? Well, actually, no. After all this time, Houdini's message was a bit more pedestrian and practical; he thought the play was a bit overlong and needed a little punching up in the humor department (no, I am not making this up). If I were one of the producers, I would be more than a bit worried; after all, if a dead guy can figure out a play is in trouble, I can't imagine what the New York critics will say about it.

—*Ken Feder*

Ken Feder is a CSICOP fellow and an anthropologist at Central Connecticut State University. □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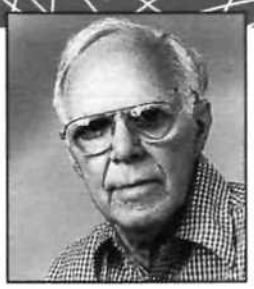

Martin Gardner
Honorary Co-chair

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Did Adam and Eve Have Navels?

What did Adam and Eve never have,
yet they gave two of them to each
of their children?
Answer: Parents.

—Old children's riddle

If you ever find yourself in the company of a fundamentalist, much pleasant argumentation can result if you ask him or her a simple question: Did Adam and Eve have bellybuttons?

For those who believe the Bible to be historically accurate, this is not a trivial question. If Adam and Eve did *not* have navels, then they were not perfect human beings. On the other hand, if they *had* navels, then the navels would imply a birth they never experienced.

Bruce Felton and Mark Fowler are the authors of *The Best, Worst, and Most Unusual* (Galahad Books, 1994). In this entertaining reference work, they devote several paragraphs (pp. 146–147) to what they call "the worst theological dispute." They take this to be the acrimonious debate, which has been going on ever since the book of Genesis was written, over whether the first human pair had what Sir Thomas Browne, in 1646, called "that tortuosity or complicated nodosity we usually call the Navell."

Brown's opinion was that Adam and Eve, because they had no parents, must have had perfectly smooth abdomens. In 1752, according to Felton and Fowler, the definitive treatise on the topic was published in Germany. It was titled *Untersuchung der Frage: Ob unsere ersten Uraltern, Adam und Eve, einen Nabel gehabt (Examination on the Question: Whether Our First Ancestors, Adam and Eve, Possessed a Navel)*. After discussing all sides of this difficult question, the author, Dr. Christian Tobias Ephraim Reinhard, finally concluded that the famous pair were navelless.

As Felton and Fowler tell us, during the Middle Ages and early Renaissance some paintings of Adam and Eve show navels; others do not. Michelangelo's Sistine Chapel painting of Adam being created by God's finger shows Adam with a navel. Most artists of later periods followed Michelangelo's lead.[1]

In 1944 the old conundrum had a hilarious revival in the United States Congress. A Public Affairs booklet titled "The Races of Mankind," by Columbia University anthropologists Ruth Benedict and Gene Weltfish, was amusingly illustrated by Ad Reinhardt. Reinhardt later became notorious as an abstract expressionist who painted canvases that were solid black, or blue, or some other single color. One of his cartoons in the Public Affairs Pamphlet No. 85 had, as here shown, a little black dot on the abdomens of Adam and Eve.

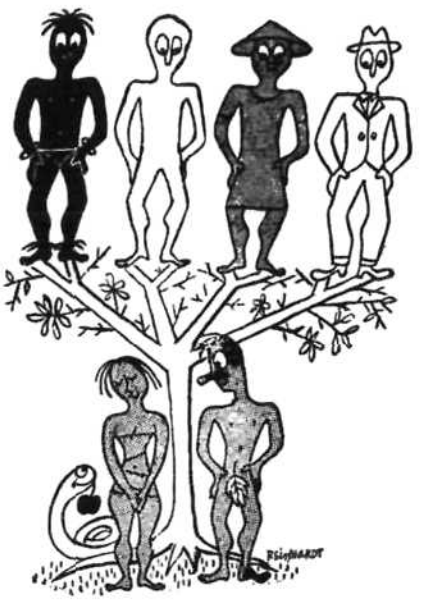

Illustration by Ad Reinhardt from the 1944 Public Affairs pamphlet "The Races of Mankind."

Congressman Carl T. Durham of North Carolina and his House Military Affairs Committee were not amused. They believed that distribution of the government pamphlet to American servicemen would be an insult to those who were fundamentalists. As Felton and Fowler point out, some cynics suspected that the congressmen really objected to a table in the booklet showing that northern blacks scored higher on Army Air Force intelligence tests than southern whites. I suspect that another basis for their opposition to the

Martin Gardner's latest book is The Last Recreations *(Springer-Verlag, Copernicus, 1997), a collection of twenty-three of his* Scientific American *columns from the last seven years before his retirement from the magazine in 1981.*

booklet was their belief that Weltfish was a Communist, based on her refusal to testify whether she was or was not a member of the Communist Party. Years later, in 1953, she was much in the news when she charged the United States with using germ warfare in Korea.

The old question about the navels of Adam and Eve figured prominently in one of the strangest books ever written. The book, written by an eminent scientist who wished to defend the accuracy of Genesis, was titled *Omphalos: An Attempt to Untie the Geological Knot*, and it was published in England in 1857, two years before Darwin's *Origin of Species*.

Omphalos is the Greek word for *navel*. A wonderful ancient myth tells how Zeus, in an effort to determine the exact center of a circular flat Earth, had two eagles fly at the same speed from opposite ends of one of the circle's diameters. They met at Delphi. To mark the spot, a piece of white marble, called the Omphalos Stone, was placed in Apollo's temple at Delphi with a gold eagle on each side of the stone. The stone was often depicted on Greek coins and vases, usually in the shape of half an egg. (See William J. Woodhouse's detailed article "Omphalos" in James Hasting's *Encyclopaedia of Religion and Ethics*.)

The author of *Omphalos* was British zoologist Philip Henry Gosse (1810–1888), father of Sir William Edmund Gosse (1849–1928), a noted English poet and critic.[2] A fundamentalist in the Plymouth Brethren sect, the elder Gosse realized that fossils of plants and animals strongly implied life that predated Adam and Eve. At the same time, he was certain that the entire universe was created in six literal days about four thousand years before Christ.

Was there any way to harmonize this stark contradiction between Genesis and the fossil record? Gosse was struck by what Jorge Luis Borges would later call an idea of "monstrous elegance." If God created Adam and Eve with navels, implying a birth they never had, could not God just as easily have created a record of a past history of the Earth that never existed except in the Divine Mind?

As Gosse realized, it is not just a question of bellybuttons. Adam and Eve had bones, teeth, hair, fingernails, and all sorts of other features that contained evidence of previous growth. Allow me to quote at length from my 1952 book *Fads and Fallacies in the Name of Science*:

> The same is true of every plant and animal. As Gosse points out, the tusks of an elephant exhibit past stages, the nautilus keeps adding chambers to its shell, the turtle adds laminae to its plates, trees bear the annual rings of growth produced by seasonal variations. "Every argument," he writes, "by which the physiologist can prove . . . that yonder cow was once a foetus . . . will apply with exactly the same power to show that the newly created cow was an embryo some years before creation." All this is developed by the author in learned detail, for several hundred pages, and illustrated with dozens of wood engravings.
>
> In short—if God created the earth as described in the Bible, he must have created it a "going concern." Once this is seen as inevitable, there is little difficulty in extending the concept to the earth's geologic history. Evidence of the slow erosion of land by rivers, of the twisting and tilting of strata, mountains of limestone formed by remains of marine life, lava which flowed from long-extinct volcanoes, glacier scratchings upon rock, footprints of prehistoric animals, teeth marks on buried bones, and millions of fossils sprinkled through the earth—all these and many other features testify to past geological events which *never actually took place*.
>
> "It may be objected," writes Gosse, "that to assume the world to have been created with fossil skeletons in its crust—skeletons of animals that never really existed—is to charge the Creator with forming objects whose sole purpose was to deceive us. The reply is obvious. Were the concentric timber-rings of a created tree formed merely to deceive? Were the growth lines of a created shell intended to deceive? Was the navel of the created Man intended to deceive him into the persuasion that he had a parent?"
>
> So thorough is Gosse in covering every aspect of this question that he even discusses the finding of coprolites, fossil excrement. Up until now, he writes, this "has been considered a more than ordinarily triumphant proof of real pre-existence." Yet, he points out, it offers no more difficulty than the fact that waste matter would certainly exist in the intestines of the newly-formed Adam. Blood must have flowed through his arteries, and blood presupposes chyle and chyme, which in turn presupposes an indigestible residuum in the intestines. "It may seem at first sight ridiculous," he confesses, ". . . but truth is truth."
>
> Gosse's argument is, in fact, quite flawless. Not a single truth of geology need be abandoned, yet the harmony with *Genesis* is complete. As Gosse pointed out, we might even suppose that God created the earth a few minutes ago, complete with all its cities and records, and memories in the minds of men, and there is no logical way to refute this as a possible theory.
>
> Nevertheless, *Omphalos* was not well received. "Never was a book cast upon the waters with greater anticipation of success than was this curious, this obstinate, this fanatical volume," writes the younger Gosse in his book *Father and Son*. ". . . He offered it, with a glowing gesture, to atheists and Christians alike. . . . But, alas! atheists and Christians alike looked at it and laughed, and threw it away . . . even Charles Kingsley, from whom my father had expected the most instant appreciation, wrote that he could not . . . 'believe that God has written on the rocks one enormous and superfluous lie.' . . . a gloom, cold and dismal, descended upon our morning tea cups" (pp. 125–127).

Henri Rousseau, *Eve*, 1905–07

As Harold Morowitz points out in his article "Navels of Eden" (*Science 82*, March 1982), Philip Gosse was acquainted with Thomas Huxley and elected to the Royal Society for his work on animals called rotifers. He had met Charles Darwin, and over a period of

many years exchanged friendly letters with Darwin about matters concerning plants and animals. "Not a word passes about evolution or creation," Morowitz writes, "or the enormous ideological gulf that separated the two great naturalists. The letters are quaint and polite and very British."

One of Edmund Gosse's best-known poems, "Ballad of Dead Cities," ends with the following stanza:

ENVOY

Prince, with a dolorous, ceaseless knell,
Above their wasted toil and crime
The waters of oblivion swell:
Where are the cities of old time?

Gosse could have written a poem about how the waters of oblivion dissolve even more rapidly such crank works as his father's effort to explain the fossil record.

I would have supposed that no creationist today could take *Omphalos* seriously. Not so! The Des Moines *Sunday Register* (March 22, 1987) published a letter from reader John Patterson arguing that the existence of a million-year-old supernova contradicted the notion that God created the entire universe about 4000 B.C. In its April issue, the newspaper ran the following response from a Donna Lowers:

> In regard to John Patterson's letter . . . on the supernova as a well-documented fact of science—of course it is! However, he cannot prove evolution except by circumstantial evidence, and creationists cannot prove creation except by God's word.
>
> To be a Christian requires one important element called faith. . . .
>
> Yes, I believe in creation by God in six days! I also believe in one day He created full-grown trees that contained rings that any scientist would declare had been there for years. He created pockets of oil deep in the Earth that nature would take millions of years to process. He placed aquatic fossils far inland, and He created exploding stars for us to marvel about in the 20th century. . . .

Although few creationists today accept the thesis of *Omphalos*, a form of Gosse's argument is frequently invoked by young-Earthers to explain why the speed of light seems to prove the existence of galaxies so far from Earth that it has taken the light millions of years to reach us. God created the universe, they insist, with light from these distant galaxies *already on the way!* Gosse would have been delighted with this argument had he known about galaxies. Indeed, I myself like it better than the alternate conjecture that in the past light traveled millions of times faster than it does now.

As for the problem of navels, today's young-Earth creationists, who believe God fabricated Adam from the dust of the Earth and Eve from Adam's rib, are strangely silent about the pair's navels. Silent, too, about other aspects of life that imply past histories. Would the trees in the Garden of Eden, for example, show rings if their trunks had been sliced? How would Jerry Falwell and other televangelists answer such questions?

Many liberal Christians, both Catholic and Protestant, now accept the evolution of the bodies of the first humans. However, as the present pope emphasized in his recent declaration that evolution is a legitimate theory (see *SI*, January/February 1997), one must insist that God infused immortal souls into Adam and Eve—souls not possessed by their apelike ancestors. This is now the opinion of almost all leading Catholic thinkers. It forces the belief that the first humans, whether one pair or more than two, were reared and suckled by mothers who were soulless beasts. I once wrote a story about this titled "The Horrible Horns"—the horns are the horns of a dilemma—that you will find in my collection *The No-Sided Professor* (Prometheus Books, 1987).

Bellybuttons are the topic of many old jokes, so let me end this column on a lighter note. It has been suggested that navels are most useful as a spot to put salt when lying on your back in bed and eating celery. And, an officer tells a civilian he's a naval surgeon. "Goodness me," the man replies, "how you surgeons specialize!"

Notes

1. How British artists handled the navel problem is discussed along with many reproductions of paintings in Horace Walpole's four-volume *Anecdotes of Paintings*, vol. 1, ch. 3. This monumental work, published in England during the years 1762 to 1771, was later expanded and revised by other authors. It may still be in print as an Ayer reprint.

2. Philip Gosse's many books include *Canadian Naturalist; Introduction to Zoology; The Ocean; A Naturalist's Rambles on the Devonshire Coast; Acquarium; Birds of Jamaica; Naturalist's Sojourn in Jamaica; A Manual of Marine Zoology* (two volumes); *Life; Actinologia Britannica; The Romance of Natural History;* and other popular books. The eleventh edition of *Encyclopaedia Britannica* says that for a time he taught zoology in Alabama. □

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INVESTIGATIVE FILES
JOE NICKELL

Fiery Tales That Spontaneously Destruct

Spontaneous human combustion (SHC) cases continue to spark controversy (so to speak), largely due to the efforts of nonscientist authors and journalists. These include self-styled British paranormal researchers Jenny Randles and Peter Hough (*Spontaneous Human Combustion*, 1992), Pennsylvania school bus driver Larry Arnold (*Ablaze!*, 1995), English coal-miner-turned-constable John E. Heymer (*The Entrancing Flame*, 1996), and—more recently—the producers of A&E network's TV series *The Unexplained*.

The continued lack of scientific evidence for SHC [see Mark Benecke's article "Spontaneous Human Combustion: Thoughts of a Forensic Biologist," in this issue, pp. 47–51] keeps proponents desperately looking for cases they can attribute to the alleged phenomenon—cases that are often quite disparate. They assign instances of unusual burning deaths to SHC rather like one might blame freak auto accidents on the Highway Gremlin. (For a discussion, see Nickell and Fischer 1987 and Nickell 1996.) Even cases with an obvious solution—like the one illustrated on page 17—are sometimes hyped. That case, involving the 1980 death of an elderly Englishwoman who fell headfirst into a burning fireplace, was duly reported by Randles and Hough (1992, 84–85, 91) and by Arnold (1995, 130).

Another case, that of Jeannie Saffin, included in Heymer (1996, 179–188) and Arnold (1995, 208–209), is quite instructive. Because the source of the body's ignition is not obvious in Saffin's death, paranormalists are especially quick to propose SHC. In doing so, of course, they engage in the logical fallacy called *argumentum ad ignorantiam* ("arguing from ignorance"), since one cannot prove a cause from a lack of facts. The case also illustrates how crucial details may be omitted and how accounts become exaggerated over time, and therefore it demonstrates the consequent need to return to original sources.

Jean Lucille "Jeannie" Saffin was a sixty-one-year-old woman with the mental age of a child, due to brain damage from a forceps delivery at birth. Her mother having died the previous year, she lived with her eighty-two-year-old father and a brother at the family home in Edmonton, in northern London. On Wednesday, September 15, 1982, a hot, humid day, Jeannie was sitting with her father in the kitchen. The windows were open. Suddenly, about 4:15 P.M., Jack Saffin's attention was directed to his daughter who was ablaze. He shouted to his son-in-law Don Carroll, and the two men put out the fire with water. Carroll phoned for an ambulance, which arrived quickly, and Jeannie was transported to North Middlesex Hospital. She was later transferred to the burn unit at Mount Vernon Hospital. She died there, nearly eight days later, at 8:10 A.M. on September 23. The cause of death was listed rather perfunctorily as "bronchopneumonia due to burns."

To proponents of SHC, the case is a spine-tingling mystery. In a chapter devoted to Jeannie Saffin's death, Heymer expresses "puzzlement about the source of her burns" (1996, 186), and he includes a statement by Don Carroll (1994) who says "there was nothing alight in the kitchen except the pilot light on the grill." Even so, Carroll insists that he saw "flames coming out of her mouth and her midriff." Indeed, he says, "the flames were coming from her mouth like a dragon and they were making a roaring noise." Yet, he insists, "Her clothes did not burn much at all" (Carroll 1994). Heymer emphasizes the latter point, insisting it is "a mystery how she came to be burned *inside unburned clothes*" (original emphasis) (Heymer 1996, 187).

Arnold essentially repeats the claims, obtaining his information largely from Heymer and apparently doing little actual investigation of his own. He writes: "As the men battled to save Lucille [*sic*], the son-in-law swore that 'she had flames roaring from her mouth like a dragon.'" He adds: "Ambulance men . . . noticed there was *no* smoke damage in the kitchen; that her clothing

Joe Nickell is CSICOP's Senior Research Fellow and author of numerous books including Secrets of the Supernatural *(Prometheus, 1988).*

was *not* burned. Only a portion of her red nylon cardigan only [*sic*] had melted" (Arnold 1995, 208–209).

Certainly the case sounds impressive—at least until investigation takes us back to original sources. First, regarding the allegedly unburned clothing, there is the signed statement Carroll gave to authorities soon after his sister-in-law's death. In that statement from twelve years earlier, he noted that "[h]er clothes were in ribbons and were charred black. She was black as well. She started to try to pick her clothes off herself but I told her to stop" (Carroll 1982). In addition, a typed account by Constable Leigh Marsden stated: "The clothes were still burning when I [Marsden] got there. I pulled off the rest of her clothes. She and her clothes were burning. I put it out with a towel" (Marsden 1982). The ambulance paramedics supposedly reported that Saffin's clothing had not burned, but what they actually wrote was that she was "wearing nylon clothes, not on fire" (Heymer 1996, 186)—obviously meaning "no longer on fire," *not* "unburned." It is disingenuous to state, as Heymer does, that the nylon cardigan was "melted not burned" (Heymer 1996, 186). In addition to the cardigan, her clothing consisted of a cotton apron and dress (Marsden 1982; Heymer 1996, 196).

As to Carroll's statements about the fire, the flames probably did appear to come from Saffin's midriff. That may have been where the nylon cardigan began burning. Also, flaming blobs of melting nylon may have caused the burns on the victim's "front of left thigh" and, after she stood up, on her "left buttock" and "patches on the right knee"—as related in the autopsy report. Since damage is typically greatest above a flame rather than below it, it is not surprising that there were also "[f]ull to partial thickness burns on the face, neck, both shoulders, front of upper chest" and "patchily distributed on the abdomen" as well as "affecting both hands" (Post-mortem 1982). ("Full thickness burns" means the skin is destroyed down to the underlying fat.)

As to the flames issuing from her mouth "like a dragon," that claim is not supported by the medical evidence. A report from Mount Vernon Hospital to the coroner's office stated that when the victim arrived at the burn unit, "There was soot in her nose, but the back of the mouth appeared undamaged" (Whitlock 1982). This was confirmed by the autopsy. Except for the bronchopneumonia (with the inflammation of the trachea and bronchi), there was "no evidence of natural disease"; nor was there any indication of *internal* combustion. To the contrary, the autopsy report confirmed: "Total body *surface* burns being about 30–40%" (emphasis added) (Post-mortem 1982).

Proponents assign instances of unusual burning deaths to SHC rather like one might blame freak auto accidents on the Highway Gremlin.

But what of Carroll's description of the flames being expelled from Saffin's mouth and "making a roaring noise"? That may have been the effect on Carroll—especially after twelve years' reflection. Those details are absent from his original statement to the police. However, Carroll does say in his later statement that, at the hospital, despite her head being swathed in bandages, "I could see into Jeannie's mouth and the inside of her mouth was burnt" (Carroll 1994). It is possible that Saffin was breathing excitedly so that the flames attacking her face were partially drawn into, then expelled from, her mouth. Heymer agrees with this possibility (Heymer 1996, 195). As to the alleged "roaring," although a doctor reportedly told Carroll he must be mistaken (Arnold 1995, 208), and even though he is admittedly technically deaf, "Even so, I heard the sound of the flames coming from Jeannie," he says (Carroll 1994). Possibly due to expectation and the interrelationship of the senses, he simply thought the flames roared.

The medical evidence makes clear that the fire was not internal but, instead, that Saffin suffered external burning as a result of her clothing catching fire. As usual, SHC proponents are unable to theorize how that could have occurred. But a clue comes from Carroll's original report in which he states, "I made a point of checking on the gas cooker and saw that it was not on and saw that my father-in-law had his pipe in his hand and I checked it and saw that it was fresh tobacco which had not been lit" (Carroll 1982). This *seems* to rule out the pipe, and, indeed, there is no further mention of it—by Carroll (1994), Heymer (1996), or Arnold (1995). Yet Her Majesty's coroner for Greater London (Western District), John Burton, told Arnold, "we usually find some smoking material, particularly in [the case of] the immobile or elderly victim" (Burton 1996).

The pipe represents just the type of "smoking material" one looks for, and Carroll's insistence that it was freshly filled and unlit overlooks an obvious possibility. Did the elderly Mr. Saffin previously knock the hot ashes from his pipe, and did an ember land in Jeannie Saffin's lap? To this very plausible scenario we must add the fact that the kitchen window and door were open, as was the back door, so that there was the potential for a draft. This could easily have caused the smoldering clothing to flare up.

If we accept this possibility, only minor mysteries remain, and we may clear them up as well. Jeannie Saffin was sitting on some newspapers in a wooden Windsor chair and SHC proponents wonder why the paper suffered no fire damage (Heymer 1996, 185). The simple answer is that Saffin's body actually protected the papers; obviously the flames did not extend to her buttock until she stood up and moved away from the chair. Proponents also wonder why there was no smoke damage to the room (Heymer 1996, 186–187). The obvious answer would be that smoke was minimized because the fire was confined to the victim and the open win-

INVESTIGATIVE FILES
continued on page 62

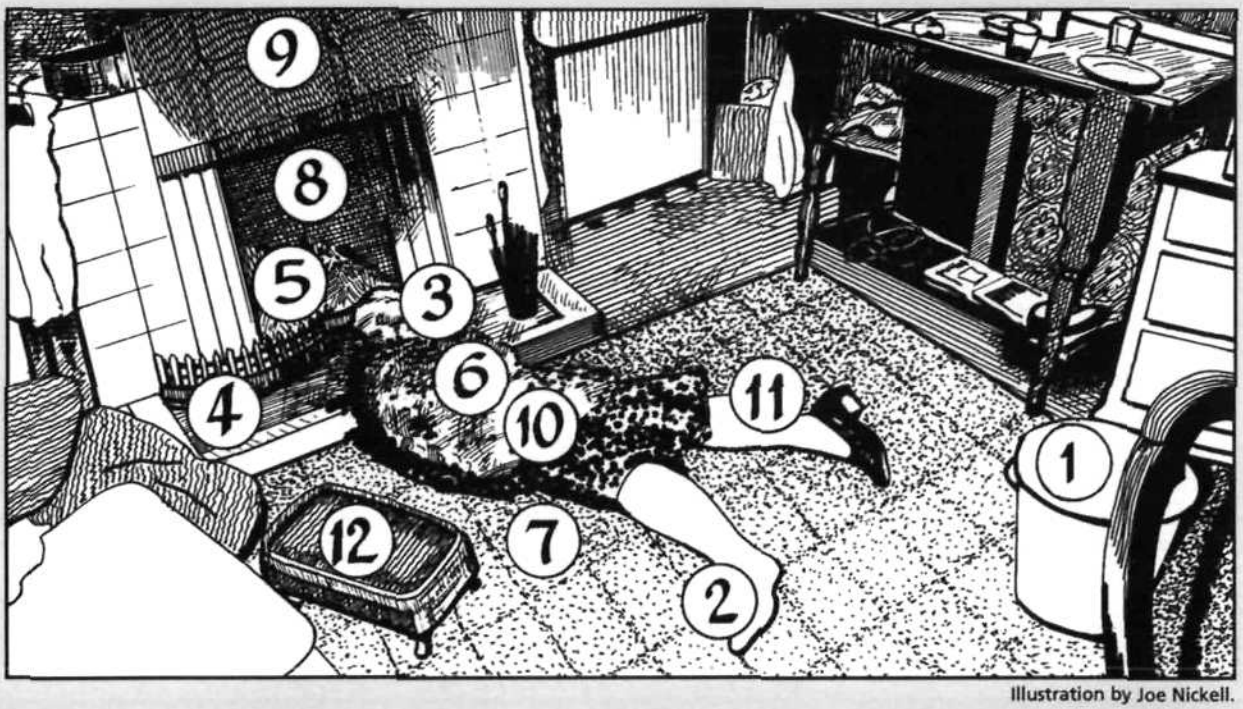


Illustration by Joe Nickell.

A Case of 'SHC' Demystified

A case of March 4, 1980, in Chorley, England, mystifies paranormalists who invoke spontaneous human combustion. Where is the mystery? Tony McMunn, a fireman who encountered the case and became an SHC enthusiast as a result, insists "there is not a lot of flesh or fat on the head, and the fire should have gone out." He and others are also impressed by the severe destruction of the body in which some of the bones were reportedly calcined (reduced to ash). However, the following investigative chronology, keyed to the pen-and-ink drawing and based on a published photograph, easily resolved the mystery. (See Randles and Hough 1992, 84–85, 91, and illus. 6.)

(1) Bucket indicated to investigators that the victim, an elderly lady, was in the process of relieving herself when she fell.

(2) The missing shoe is consistent with this or other possible scenarios. Apparently it came off during fall—or her taking it off caused the fall—and is out of view.

(3) In falling, the victim obviously hit her head on the fireplace, knocking her unconscious or possibly killing her outright.

(4) Her head struck the iron grate, which has been sharply displaced to the left.

(5) The fall caused flaming embers from the now-exposed "open coal fire" to shower upon the body.

(6) The victim's clothing ignited and, as the fire progressed, her own melting body fat contributed to the overall destruction.

(7) The rug beneath the body may have retained melted body fat to aid in the severe destruction—a process known in the forensic literature as the wick effect.

(8) The fire was probably further aided by the chimney effect—a "drawing" of the flame and venting of smoke—in this case by the chimney itself. At about 9:30 on the previous evening, when it is believed the fire took place, neighbors saw a great amount of smoke and sparks issuing from the chimney.

(9) Heavy deposits of soot above the fireplace, tapering toward the chimney opening, are consistent with the chimney effect and the venting of considerable organic material.

(10) The destruction of the body was in approximate proportion to its proximity to the fire source, the torso—which contains a large amount of fat—being most severely destroyed, while the lower legs and feet have remained intact.

(11) As in many other such cases, the lower extremities were spared because fire burns laterally with difficulty.

(12) Nearby objects failed to burn for the same reason. Only radiant heat, and not flame, reached these objects.

—Joe Nickell

MEDIA WATCH

The Media Watch column this time is devoted to independent commentaries/reports.
—The EDITOR

PBS's *Firing Line* Creation/Evolution Debate Scores Well for Scientific View

Congratulations to the participants in the Public Broadcasting System's two-hour *Firing Line* debate on evolution and creationism, telecast the night of December 19, 1997. It was an illuminating program, and the pro-evolution scientific viewpoint was well—even aggressively—presented. The debate was held at Seton Hall University in South Orange, New Jersey, before a student audience. Michael Kinsley moderated with humor and wry detachment.

William F. Buckley Jr. and three colleagues argued in favor of the proposition, "Resolved: The evolutionists should acknowledge creation." Joining Buckley in the affirmative were Berkeley law professor Phillip Johnson, author of *Darwin on Trial*, *Reason in the Balance*, and *Defeating Darwinism by Opening Minds*; Lehigh University biochemist Michael Behe, author of *Darwin's Black Box*; and David Berlinski, whose *Commentary* article last year on the defects of evolution generated considerable attention.

Opposing the resolution were Barry Lynn, executive director of Americans United for Separation of Church and State; Eugenie C. Scott, CSICOP fellow and executive director of the pro-evolution National Center for Science Education; Michael Ruse, philosopher from the University of Guelph and editor of *But Is It Science?* and *Philosophy of Biology*; and biologist Kenneth Miller of Brown University.

One strength of the debate was its flexible format, which, besides allowing for brief introductory remarks, gave participants the opportunity to question and be questioned by the opposition in various combinations. This showcased the other great strength of this debate, the debators' diversity of backgrounds and reasons for participating. Buckley and Johnson focused on the materialist aspects of evolutionary theory, seeking to represent evolution as a philosophy or dogma, in no way superior to others, liberal in orientation, and closed-minded, if not hostile, to nonmaterialistic alternatives. Behe espoused his theory that the intricate, interdependent complexity of nature, exhibited in such features as cellular design and the suitability of atomic structures to facilitate living systems, inarguably points to the existence of a creator (though not necessarily God; it could be aliens). Berlinski played the role of the ultimate skeptic, seeing no predictive theory at all in evolution, disavowing any support for Darwinism in the fossil record, and demanding explicitly that *all* transitions must be present in the fossil record to determine ancestral-descendent relations.

The diverse backgrounds of the pro-evolution participants provided a more well-rounded opposition to the resolution than one might have expected had their side consisted solely of evolutionary biologists. Early in the debate, Scott said the same percentage of scientists as the general public (40 percent) allow for the possibility of God-like involvement with evolution. Lynn, the team leader, outrightly disavowed materialism as the exclusive form of truth and argued convincingly that the ideas and intent of religion and evolutionary theory are different but compatible. Ruse interjected rare levity to the debate with such lines as, "I'm a philosopher—I've never said anything in a minute and a half," or the amusing side-track, "I'm all for the theory of gravity having a great future." He also attacked the philosophical weaknesses of intelligent design theory, as when asking whether Behe's theoretical creator is also responsible for the complexity of "bad" things like parasites. The anchor of the pro-evolution side was Kenneth Miller, who aggressively and effectively countered many of the opposition's assertions. He came armed with a plethora of visual aids including "mutated" rat-traps that still functioned, despite lacking a part, and graphical representations of elephant evolution and intermediates between doglike mammals and whales.

Evolutionary scientists have often not fared well in debates with creationists, but this one was different. The debate was generally high-toned and civil, the format allowed all participants ample opportunity to present their views, and the pro-evolution side came in obviously well prepared and with a good strategy. With minimal jargon, they strongly and clearly presented pro-evolution scientific arguments; at the same time, they seemed to keep the anti-evolution speakers off balance by having ready counterexamples and questioning them strongly on what they had to substitute for evolution and natural selection.

It was refreshing that two of the evolutionists acknowledged their own religious beliefs and thus helped disarm any strong religion-versus-science polarity common in such debates. As an evolutionist, I find it onerous to be equated with an atheist or to be held to the notion that teaching evolution is equivalent to teaching that life has no meaning or that morality is some sort of sham.

Buckley concluded with the question of whether man be ape or angel. The empirical evidence clearly supports the former. But other forms of inquiry, such as faith, may lead to the latter conclusion with no inconsistency. Isn't there some equal measure of truth in the feelings and reflections brought about by poetry, music, and painting? What scientist is not moved by the sublime beauty of nature? These feelings are quite outside the realm of scientific scrutiny and yet are still true features of life. The magic of existence and the need to find meaning outside the desire to survive and reproduce is the province of all people, scientists included.

One small criticism: Although evolution itself was strongly defended, the significance of natural selection as its primary mechanism was left more vulnerable. The most profound truth of evolutionary theory, as I see it, besides the fact that all organisms are related with a pattern of descent with modification, is that all organisms strive to populate the Earth with their offspring and all have the capacity to do so. Is it so hard to understand that this necessarily creates the fierce competition we call natural selection? It is a great disservice to characterize this force coldly as a "random process." Evolution is powered by the greatest force in the universe—the will to survive. That and a little solar power.

Though I strongly believe evolution should be taught without creationist adulteration, the reality is that a large portion of introductory students come into the classroom confused between evolutionary and creationist ideas and approaches. Showing this debate would be an excellent introduction to this controversy for high school students.

—Christopher K. Frazier

Christopher K. Frazier is in the Department of Biology at the University of New Mexico, where he studies the evolution and ecology of plants.

Skepticism in Action: *Simpsons* Religion vs. Science Episode

Skepticism in action—and the price paid by skeptics—was delightfully and insightfully presented in an episode of Fox's *The Simpsons*.

In the episode, which aired November 23, 1997, Lisa Simpson attempts to halt construction of a parking lot for a new megamall. The mall owners allow Lisa and her classmates to dig for fossils. Lisa finds what appears to be a skeleton with wings. The townspeople believe it is an angel. Lisa's dad, Homer, grabs the skeleton and takes it home.

Springfield residents flock to Homer's house to pray with the angel and have it bless them. Homer commercializes angel-viewing (fifty cents a look), along with the sale of trinkets, such as angel glow-sticks and angel ashtrays.

Lisa asks museum curator Stephen Jay Gould to analyze a piece of the skeleton. When she reports this, Homer claims that "facts are meaningless. You can use facts to prove anything that's even remotely true. Facts shmacts." Gould claims his study is inconclusive. The minister says: "Science has faltered once again in the face of overwhelming religious evidence."

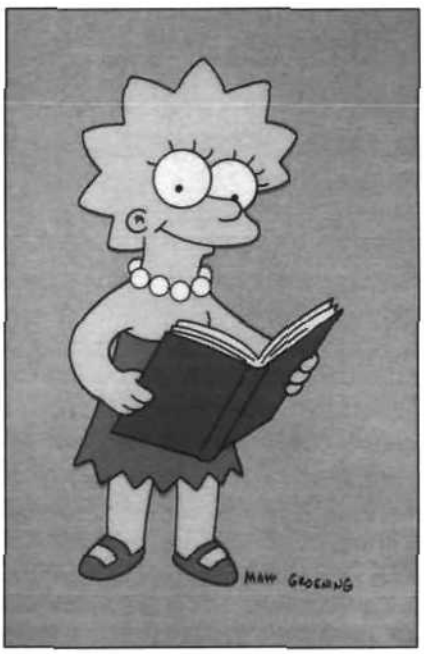
Interviewed on TV, Lisa says, "You can either accept science and face reality, or you can believe in angels and live in a childish dream world." This moves Moe, the bartender, to exclaim, "What's science ever done for us?" The Simpsons' deeply religious neighbor, Ned, says that "Science is like a blabbermouth who ruins a movie by telling you how it ends. There are some things we don't want to know. Important things."

A mob goes on an anti-science rampage, attacking the planetarium, robotics laboratory, the museum of natural history, and the Christian Science Reading Room. When a mammoth tusk falls on Moe, he prays that medical science can cure him.

Lisa is accused of destroying the angel. In court, the judge issues a restraining order: religion must stay five hundred yards from science at all times.

But the angel reappears on a hill. "The end will come at sundown" is now inscribed on the angel's base. The reverend proclaims "the day of reckoning is upon us."

The crowd gathers at sunset, while Lisa reads *Scientific American*. Suddenly, bathed in light, the angel begins to rise, saying, "Prepare for the end—the end of high prices. Behold the grand opening of the Heavenly Hills Mall." The mall owners claim that it was not a hoax, but a publicity stunt. Lisa complains, but



the mob rushes to the mall. Gould confesses he never tested the specimen.

Lisa and her mother, Marge, reconciled again, walk off hand in hand.

—Marshall Berman

Marshall Berman is a physicist in Albuquerque, New Mexico.

For a commentary on Fox Television's "Magic's Biggest Secrets Finally Revealed," broadcast November 24, 1997, see Edward Summer's Forum column in this issue, page 59.

Scientific American Frontiers Episode 'Beyond Science' Features CSICOP Fellows, Provides Skeptical Exploration

On November 19, 1997, PBS aired an episode of the *Scientific American Frontiers* series called "Beyond Science." The program's host, Alan Alda, dowsed for water, conducted an alien autopsy, had his handwriting analyzed by graphologists, tracked down a purportedly unlimited new energy source, and explored therapeutic touch. All the while, CSICOP fellows Ray Hyman, Barry Beyerstein, Steven Weinberg, and Philip Klass were by his side explaining to viewers the not-so-extraordinary science behind the phenomena.

For perhaps the most instructive segment—a test of the accuracy of a well-known dowser—Hyman and Beyerstein prepared a course of pylons in a farm field. A metal object—the target for dowsing—was hidden beneath one of the pylons. The dowser then walked the course waiting for his dowsing rod to point in the direction of the correct pylon. Despite much showmanship, several guesses, and offers of excuses, the dowser could not pinpoint the pylon under which the dowsing target lay. In the same segment, host Alda, holding the dowsing rod, demonstrated how the movement of the rod is likely to be the result of the self-deceiving work of slight manipulations of muscles in the hands.

The episode of *Scientific American Frontiers* is proof positive that educational, skeptical explorations of the paranormal can make for provocative and successful television. The balanced, critical treatment of the paranormal and pseudoscience has been and continues to be one of CSICOP's primary missions. CSICOP's collaboration with *Scientific American Frontiers* is the latest in a long history of successful work with the broadcast media that includes ABC's *20/20*, the BBC, the Discover Channel, A&E, *Dateline NBC*, and PBS's *Nova*.

—Matthew Nisbet

Matt Nisbet is Public Relations Director for CSICOP.

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Frontline Series Wins Top TV Journalism Award

On January 12, 1998, the PBS weekly documentary series *Frontline* received the top honor in the prestigious Alfred I. DuPont-Columbia University Awards for Television and Radio Journalism. *Frontline* received the Golden Baton award for four programs, one of which was its lengthy exposé of a miscarriage of justice involving recovered memory therapy and unfounded accusations of childhood sexual abuse. (For an update on the recovered memory controversy, see the Special Report, "The Price of Bad Memories," by Elizabeth Loftus, in this issue, pp. 23–24.) □

Maharishi Management University's Frequent Fliers

Big things are happening at the Institution Formerly Known as Maharishi International University (MIU). Bringing its karma into style with the nineties, it recently made itself over as the Maharishi University of Management (MUM) (see its Web site at http://www.mum.edu). While in Iowa recently, I had a chance to visit MUM in the company of CSICOP consultant John W. Patterson of Iowa State University. We found that despite the Maharishi school's new all-business name, it keeps much of its transcendental flavor. The campus, located in the small town of Fairfield in rural southeast Iowa, still calls one of its housing units Utopia Park and still boasts of a College of the Science of Creative Intelligence, which contains a Department for the Development of Consciousness. One of its faculty members, John Hagelin, still regularly runs for president of the United States on the Natural Law Party ticket.

Today MUM's bustling enterprises are branching out in many directions. One of them is Maharishi Global Construction, which claims to create "homes and offices that, by their mere design, create good health, clear thinking, happiness, harmony, and prosperity for family or business." Their trademarked "Maharishi Sthapatya Veda Design Services" promises "A Heavenly Life in Accord with Natural Law" (http://www.mgc-vastu.com). Apparently, having entry doors facing east has something to do with this: a Maharishi-affiliated restaurant called Mohan Delights boasts that it is the "first Indian restaurant [in Fairfield] with an EAST ENTRANCE." It serves "truly Ayur-Vedic lunches balanced for each body type and season." If that is indeed the case, it would seem to be a restaurant where the waiter tells you what you are going to eat, instead of the other way around. We wanted to dine there and find out for sure, but unfortunately it wasn't open, so we had lunch instead in a different Indian restaurant whose entrance faces north. The food wasn't particularly good, which is what one might expect from an institution that flagrantly flouts proper Ayur-Vedic principles.

The "bubbling bliss" of yogic flying. (From http.www.yogicflying.org.)

Another local business enterprise is the Maharishi Vedic Astrology Corporate Consulting Service, which enables you to "choose partners and employees through Compatibility Analysis." Fortunately, "negative influences from planets can be neutralized through proper Vedic performances—the Maharishi Yagya program."

But MUM's most interesting enterprise by far is its Yogic Flying Club, which promises its members a chance to "experience bubbling bliss and create peace and harmony in the world." According to MUM, "Harvard-trained quantum physicist, Dr. John Hagelin comments that Yogic Flying, the ability of the body to float and fly, really

Robert Sheaffer's World Wide Web page for UFOs and other skeptical subjects is at http://debunker.com/~sheaffer/ufo.html.

demonstrates mastery over the gravitational force, which cannot occur without transcending (going beyond) the classical laws that prevent such a phenomenon. Only by taking recourse to quantum gravity, occurring at the level of the Unified Field, is one able to seemingly defy gravity on the superficial level. Yogic Flying and levitation in general is thus a clear demonstration of the ability of the human nervous system to function coherently at the level of the Unified Field."

Unfortunately, there are few opportunities to actually witness these wonders. MUM acknowledges that "flying" must be preceded by "bouncing," then "hovering," but there is no clear proof that anyone has ever gotten beyond "bouncing."

The Maharishi campus boasts of two large "Golden Domes" bearing no inscription and having no visible indication of their function. When told by a fellow skeptic that these were "yogic flying domes," I was, frankly, incredulous. However, Jack Patterson and I were fortunate that we happened to saunter up to the entrance hall of the dome closest to the main road just as the Men's Yogic Flying Team was entering to take up its position inside the Men's Flying Dome. (The other dome, we learned, was the Women's Yogic Flying Dome—apparently MUM feared that mixing the two sexes might lead to loss of transcendental concentration, and potentially even to sudden and dangerous loss of altitude.)

We followed them in, but unfortunately we were not allowed inside the dome, because apparently MUM issues something like a yogic pilot's license, without which one cannot enter the domes. I could see, however, that the dome's vast floor was mostly covered with cushions, color-coded by sections, on which a number of men were sitting with legs crossed, getting ready to take off. Nobody was yet hovering, let alone flying, but the flying probably started just as we were shown the door. If you visit the Web site of MUM's Yogic Flying Team (http://www.yogicflying.org), you can see for yourself some transcendental aeronauts seemingly hovering in mid-air in front of the men's dome. However, one can only speculate as to how much time (or how little) the three remained airborne.

* * *

Disgraced former Justice Department official Webster Hubbell, recently released from the slammer, has just published his "tell-all" book which, while unimportant from the standpoint of politics, contains a startling revelation nonetheless. In *Friends in High Places*, Hubbell writes that his longtime friend and associate Bill Clinton was intrigued by UFOs and wanted to know if they really existed. Indeed, Hubbell says this was one of the highest priority tasks with which Clinton charged him when appointing him to the Justice Department. According to Hubbell, Clinton

said to him, "Webb, if I put you over at Justice I want you to find the answers to two questions for me. One, who killed JFK? And two, are there UFOs?" Hubbell insists that, far from joking, Clinton "was dead serious. I [Hubbell] had looked into both, but wasn't satisfied with the answers I was getting." Apparently the secret government files on JFK and on UFOs are buried so deeply that even direct orders from the president do not suffice to pry them loose.

When asked about Hubbell's remarks on UFOs and JFK, presidential spokesman Mike McCurry would not say whether or not they were true: "I am not going to respond to the specific things in books that are written," was his response. □

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For more information, contact Barry Karr, Executive Director of CSICOP, at **(716) 636-1425**. All inquiries will be held in the strictest confidence.

The Price of Bad Memories

ELIZABETH F. LOFTUS

After hundreds of articles on recovered memory therapy, one might have thought there was not much left to say. But a November 1997 front-page article in the *New York Times* headlined "'Memory' Therapy Leads to a Lawsuit and Big Settlement" suggested that the repressed memory controversy had broken new records (Belluck 1997).

The article reported on the case of Patricia Burgus, whose family had accepted a $10.6 million settlement, the biggest to date in any lawsuit accusing mental health professionals of implanting false memories into the minds of patients.

Burgus had been referred to a large Chicago hospital for severe postpartum depression. Burgus alleged that while she was undergoing psychiatric therapy from 1986 to 1992, she was persuaded that she had been part of a satanic cult, had been abused by numerous men, had abused her own children, and had had sex with John F. Kennedy. Drugs and hypnosis helped her "recall" that she had cannibalized people. At one point, her husband brought in some hamburger meat from a family picnic, and the therapists agreed to test the meat to see if it was human.

Burgus was diagnosed with multiple personality disorder (MPD) and developed numerous "alters" (alternative personalities). Even today, Burgus has trouble remembering what they were, in part because her therapist would get her alters mixed up with those of his other patients.

On the fourth day of her deposition, in December 1996, Burgus was trying to recall some of the alters for the attorney who was questioning her (*Burgus v. Rush-Presbyterian-St. Luke's Medical Center*):

> Q: Who did he ask to come out?
> A: Little—Little One.
> Q: Little Little One or just Little One?
> A: I'm sorry. I stuttered. Little One. He—oh, just a second. There was . . . something called—let me think—guardian keeper or—I later found out that was someone else's personality, a different patient.
> Q: Oh, he was mixing other people's personalities in with yours?
> A: Yes.

She went on to explain that this would happen a couple times a month. Then she relayed the following unusual therapeutic activity:

> A: Well, there was one where he played a tape recording to me of someone else's session, and it was a woman speaking in a child's voice. And later in the session that I was listening to, the person switched back to a voice that I recognized on the unit and realized that that was not me on the tape.

Burgus eventually realized that she did not have MPD after all. She had not been an abused devil-worshipping cannibal. She had not abused her young children, who had also been hospitalized for nearly three years because doctors thought her disorder might be genetic. She sued her former therapists, or mind "hackers," as they were called in a recent *New Yorker* piece (Andersen 1997). The case was settled on the day that the trial was expected to commence, six years after the case had been filed, and eleven years after Burgus began her questionable therapy. Of the $10.6 million, the medical center agreed to pay approximately $3 million and the psychiatrists agreed to pay the remainder.

Within weeks of the Burgus settlement, there was another "first" in the long, dreary repressed memory controversy. A federal grand jury in Houston, Texas, returned an indictment against the administrator and four caregivers at the former Spring Shadows Glen Hospital. The criminal charges accused the mental health professionals (psychologists, psychiatrists, psychotherapists) of exaggerating diagnoses and overstating the need for expensive treatment in order to unjustly collect insurance payments.

The accusations are that the professionals convinced patients that they had participated in satanic cults and that they had MPD. In the words of the indictment: "It was further part of the conspir-

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acy that the defendants and others would and did fraudulently treat the insured patients for MPD caused by unsubstantiated and unrealistic allegations and abuses, including satanic ritual abuse and cult activity, while at the same time creating medical records to substantiate such treatment" (*United States v. Peterson et al.*, 8).

Moreover, the indictment alleged that the defendants "did fraudulently elicit statements of satanic ritual abuse and cult activities from the admitted patients, through nontraditional treatment modalities, including the use of leading or suggestive questions during therapy sessions while the patients were: under hypnosis; under the influence of a drug or combination of drugs; isolated from their families, friends, and the outside world . . ." (*United States v. Peterson et al.*, 8).

While the case against the Spring Shadows Glen professionals is believed to be the first federal indictment involving allegations that therapists instilled false memories, the civil case brought by the Burgus family follows a long trail of similar cases.

The False Memory Syndrome Foundation (FMSF) published the results of its survey of the outcomes of recent malpractice suits against therapists in its December 1997 newsletter (False Memory Syndrome Foundation 1997). An analysis of 105 malpractice suits filed by former patients against their therapists for development of false memories revealed that one case was dropped, forty-two were settled out of court, fifty-three are still pending, and nine went to trial. Of the cases that went to trial, all ended in a verdict in favor of the plaintiff (patient) against the defendant (therapist).

A few of the specific trial outcomes were mentioned in a sidebar to the survey results: In 1994, a Pennsylvania jury awarded $272,232 to seventeen-year-old Nicole Althaus and her parents. In two separate Minnesota cases against the same psychiatrist, Vynnette Hammane was awarded approximately $2.6 million (in 1995) and Elizabeth Carlson was awarded $2.5 million (in 1996) against the psychiatrist, whom the women claimed had used hypnosis, guided imagery, sodium amytal, and other methods to get them to develop false memories of childhood sexual and ritual abuse. In 1997, a Texas jury awarded $5.8 million to Lynn Carl, who claimed she was misdiagnosed as an MPD with five hundred alters and treated for satanic ritual abuse.

What can we expect in the coming years? First, there will be more civil suits, as once-destroyed families find themselves reconciling.

As for criminal indictments, it is hard to know whether more will follow. One organization to which at least one of the indicted therapists belongs, the International Society for the Study of Dissociation (ISSD), issued a news release objecting to the criminal charges and soliciting financial assistance for the defense. The ISSD said that the legal development could have a chilling effect on the provision of health care in the United States. The organization further said that prosecutions on charges of this kind show that "the Federal government is indicating their willingness to set standards for diagnosis and treatment" and that the government has decided the professionals involved "purposely created false memories" and has "seemingly decided that the patients' memories were not accurate."

The ISSD further invited readers of its news release to imagine when the criminalization scenario is generalized to other patients and other professionals: "Will any patient who is unhappy with the outcome of any form of therapy be able to allege that purposeful criminal fraudulent therapy was performed and cause a therapist to be indicted? Will the government now seek to imprison doctors treating patients who allege Agent Orange exposure, Gulf War Syndrome, unknowing exposure to government radiation testing, or other events that the government has not wished to acknowledge? Will mental health providers risk jail time for treating those traumatized by combat activities that the government prefers to deny? Will a physician be subject to prison time for mistakenly diagnosing indigestion in a patient who is having a heart attack? If these things can occur, then what professionals in their right mind will want to remain as providers of health care?"

Clearly some therapists are threatened by the very prospect, not to mention the reality, of criminal prosecution, and will take steps to make sure this doesn't happen again. Time will tell.

The problems that our society has had to face over the repressed memory controversy have changed to some extent, but they are still not over. Compared to the early 1990s, there are fewer cases of people suing individuals based on claims of massive repression and recovery of abuse. There are more cases of people suing their former therapists for planting false memories. There is the prospect of criminal prosecution based upon fraudulent practices. But can we walk away from this controversy now? There are still hundreds, perhaps thousands of families who have been devastated by repressed memory accusations. There are elderly parents who have one wish left in life—simply to be reunited with their children. There are talented mental health professionals who have found their profession tarred by the controversy. And there are the genuinely abused patients who have felt their experiences trivialized by the recent sea of unsubstantiated, unrealistic, and bizarre accusations.

There is still much to be done to fix these remaining problems.

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Science in the Public Eye

Will Cooper

"To understand the things that are at our door is the best preparation for understanding those things that lie beyond."

—Hypatia

"Supposing is good, but finding out is better."

—Mark Twain

According to a National Science Foundation study, less than half of the adult population of the United States knows that the Earth rotates around the Sun once a year. Only a paltry percentage can accurately describe in simple terms what a molecule is (National Science Board, *Science & Technology Indicators—1996*). The popularity of pseudoscience, UFOs, and New Age nostrums shows no evidence of cooling off. What lays the groundwork for irrational beliefs and paves the way for hoaxsters and hustlers of the paranormal is, in part, a widespread misapprehension of the basic discoveries, ideas, methods, and aims of genuine science.

Last fall, on October 3–6, a group of two hundred leading scientists, scholars, and communicators from around the world met in Chicago for **"Sputnik at 40: 1997 International Conference on the Public Understanding of Science and Technology."** The conference was sponsored by the International Center for the Advancement of Scientific Literacy (ICASL), a Chicago-based organization whose purpose is to improve international cooperation and cross-fertilization among researchers in the field of scientific literacy. The conference title refers to the fortieth anniversary of the launch on October 4, 1957, of Sputnik I, the world's first artificial satellite. Especially in the United States, that event had a powerful impact on public awareness of the need for better science education.

The three-day conference was kicked off with a dinner reception in honor of the late Carl Sagan. A large portrait of the astronomer, author, and champion of reason stood prominently in the center of the floor. Later in the evening, Jon Miller, director of ICASL and a first-rate researcher in the field of the public understanding of science, read a letter to the participants from Sagan's wife and collaborator, the writer Ann Druyan. It captures perfectly the concerns that led to the conference:

> Carl Sagan was often asked why he, a scientist fully engaged in multidisciplinary research and academic commitments, was such an energetic proponent of public science education. I recall that wonderful smile and the answer he frequently gave: "When you're in love you want to tell the world."
>
> That passionate appreciation of the wonders of the universe revealed by science was certainly central to his effectiveness in attracting people all over the planet to study, teach, and do science. But there was more. Carl was absolutely convinced, as am I, of an urgent imperative for science education. We live in a society utterly dependent on science and high technology. We cannot hope to maintain even the limited degree of democracy that we now have if the great majority of us are alienated from the language and methods of science. The byproducts of the scientific and technological revolution of our time are a series of complex choices that require an informed electorate. How long will we remain free if those decisions are made by a tiny, unchallenged elite, speaking a language that only a few of us comprehend?

For three days the delegates assembled in the opulent main lounge of the Union League Club of Chicago, surrounded by paintings by masters such as Innes and Monet. Attached by wire to the forty-foot ceiling, and looking puny among the grand nineteenth-century décor, hung a scale-model of Sputnik I, the symbol of the event. Jon Miller recalled how Sputnik's "beep . . . beep . . . beep" sent shockwaves through the U.S. body politic, triggering the space race and prompting a majority of people, experts and laymen alike, to conclude that the United States had fallen behind the Soviets in science and technology.

Most Americans at the time held the complacent belief, based on post-war

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prosperity at home and economic dominance in world trade, that the U.S. scientific and technical establishment ruled the competition. But a poll taken in the weeks after the launch showed that nearly 70 percent of the public thought that "our schools have put too little stress on science" (Opinion Research Corporation survey, January 1958).

In response to increasing pressure on the issue, President Eisenhower appointed James R. Killian Jr., the head of MIT, as his special assistant, charged with reinvigorating the nation's space effort. NASA came into existence within a year, and over the next two decades the National Science Foundation (NSF) would spend more than $1 billion on programs to enhance education in the sciences and engineering.

Miller described the importance of Sputnik I this way: "[Sputnik] was a significant event, because it caused a major reexamination of education in the United States, increased funding for virtually all science and technology, attracted large numbers of talented young people into science, and stimulated a public curiosity about space that continues to today."

What Is Scientific Literacy?

One of the conference speakers was physicist and author James Trefil. Trefil served as a collaborator with the late E. D. Hirsch in writing *The Dictionary of Cultural Literacy*. His ideas reflect the same principle that motivated the book—that scientific literacy for a nonspecialist boils down to having enough basic knowledge about science to be able to understand a newspaper article or to speak familiarly about the subject in a general discussion. After working with Hirsch, Trefil published another book in the same vein called *1001 Things Everyone Should Know About Science*. Again, what he argues is that scientifically literate citizens should be conversant with the major conclusions of the basic sciences and able to comprehend a nontechnical presentation of scientific ideas that draw upon this shared foundation of knowledge.

Many participants felt that scientific literacy involves more than just having command over a prescribed set of factoids. Jon Miller said scientific literacy is about having the rock-bottom skills necessary to "participat[e] in the modern world." More and more jobs will require technical training; everyday decisions will increasingly require an ability to reason about technical issues; and public policy debates will more and more rely upon scientific data and conclusions. In short, the ability to grasp the essentials of a scientific argument—to gauge the validity and implications of scientific and technical information—will be indispensable to every citizen of a twenty-first-century democracy.

Scientific Literacy and Fate Control

Senta Raizen, a Ph.D. chemist and director of the Washington-based National Center for Improving Science Education, says that scientific literacy does concern national priorities such as economic competitiveness, but more profoundly, it is about "empowerment for the individual." She says it is about "fate control."

"If I'm told by my doctor, 'You decide what treatment you want for your breast cancer,' and I have no way of dealing with that question at all, then I could be totally at the mercy of some quack's opinion," said Raizen. "For me, it's a question of whether I can handle the issues that cut close to me and are important to the society in which I live."

According to John Durant, a professor of the history of science at Imperial College and the assistant director of the National Museum of Science and Industry in London, all of us live in societies that are "more closely dependent on science and technology than ever before in history."

"The dangers of not knowing how one's own society works range from a general sense of alienation that people who are undereducated can have to practical and political disadvantages," said Durant.

A number of conferees echoed this idea: Scientific literacy, in an age dominated by science and technology, is not just about individual survival. It also takes into consideration such intangibles as personal dignity and a sense of belonging to the society in which we live. People who feel frightened or bewildered by science and technology may feel estranged from a society in which science and technology play a central role.

The question of the public's understanding of science and technology also vitally concerns the continued democratic character of societies governed by popularly elected representatives. If progressively fewer average citizens have the knowledge to become active in debates over scientific or technical policy issues, at what point would the people lose their effectiveness in monitoring elected officials? Could a scientific/technical elite one day assume an unchallenged role in making decisions that affect the masses of ordinary people?

Miller estimates that about one in ten Americans are "attentive" to science and technology policy issues, a level that has remained stable for more than a decade. Of this group, most attend to only a tiny fraction of current debates. A certain amount of "issue specialization" is inevitable, given the complexity of the issues and the limited time people have to attend to public affairs. The question becomes, "How many people attentive to any particular issue does it take to serve as a "surrogate public?"

Miller's work in assessing the American public's attentiveness to the space program, for instance, reveals that about 12 percent of the U.S. population—or about 22 million people—express a high level of interest and are well-informed on space-related developments. This core group exercises a disproportionately large influence over space policy, reflecting the pattern of a "weak-party strong-interest-group political system." What Miller says about the space program could as easily be applied to any issue involving science and technology.

Is 12 percent, or 22 million individuals, big enough to be thought of as democratic? Science and technology

> issues pose a special problem for the specialization model. Apart from the normal distribution of personal and profession interests, meaningful participation may require some minimal level of scientific understanding to be able to comprehend the arguments about a pending public policy issue. Given this dual set of hurdles, we might agree that an attentive public is the 20 million plus range is minimally acceptable, but urge that educational policies and practices seek to produce a large number of attentives in future generations.

Another, consideration is maintaining the ethical standards and integrity of science itself. When the work of scientists has an impact directly on people's lives, people have an obligation to ask tough questions and challenge the scientists' findings, when and if that seems appropriate. This is just an extension of the way science is done. Having the public involved provides another dimension of accountability.

Paths to Scientific Literacy

It is hardly surprising that people who stay in school longer are typically more scientifically literate. Surveys show a definite correlation between level of education and knowledge about science. The primary goal of increasing scientific literacy then becomes keeping people involved in formal education for as long as practical and necessary, realizing that not all people have the same interests or abilities. The second is to package the subject matter of science in ways that make it attractive, while still conveying its substance.

Informal education also plays a vital part in promoting scientific literacy, especially for continuing education. Museums, zoos, arboretums, conservatories, planetaria, aquariums—all help disseminate knowledge about science and help make science engaging for a mass audience.

"It's very striking when you look at kids in science museums," said John Durant, "to see that most of them seem to really be enjoying what they're doing and engaging in what they're doing. That's a clue to the role that the informal sector can have."

Also key is the part played by the mass media. Conference speaker Mary Wooley, president of Research America, a science advocacy group active in the area of biotechnology, said it is crucial that the media have "a reality-based understanding of science."

Too often the media fall short of Wooley's recommendation. Incapable of understanding technical details, many journalists tend to romanticize science stories. In the case of Sputnik, they focused on the speculative question of life on other planets or on the then-still-fantastical idea of visiting the Moon. The same preoccupation could be seen recently in the broadcast media's coverage of the Mars Pathfinder mission. The spectacular geological data that was returned, showing a more Earth-like Mars than had been previously thought, was hardly discussed in the mass media. Instead, journalist after journalist repeated the same question: "Did Pathfinder turn up any evidence for life on Mars?" They kept asking this, even though Jet Propulsion Laboratory representatives made it clear from the beginning that the mission was never designed to look for any evidence of Martian life, past or present. The media just *assumed* people wanted to hear about the imaginative equivalent of "little green men," not about the real science that was being done.

Sensationalistic press coverage of scientific discoveries does nothing to advance public understanding of science. For every *Nova*, there seem to be a dozen shows about UFOs or strange mysteries of the occult. Speaker Larry Gross, a professor of communication at the Annenberg School for Communication, emphasized that television is not well-suited for the dissemination of scientific ideas, because the medium stresses "limited dialogue and visual action."

Print media do a better job but reach far fewer people. Even the daily newspapers have a tendency to sensationalize science. George Hersbach, president and CEO of a biotech manufacturing company in the Netherlands called Pharming Health Care Products, spoke on this topic. His company uses transgenic cows and rabbits to produce chemicals, manufactured normally in a healthy human body, for patients whose bodies are unable to make them. The press and broadcast media tend to run stories about Pharming that stress loosely related, but controversial, subjects such as human cloning. The actual work of the company hardly gets mentioned. Sometimes the full text of an article presents a more representative view of Pharming's business, but the headlines and lead paragraphs don't. "Nobody reads the whole article," said Hersbach. "The articles could be good, but the headlines bad."

The conference examined many other questions about public attitudes toward science. For instance, political decisions regarding research funding can often be influenced by popular perceptions. From a strictly self-interested perspective, the scientific community should understand how the public views science and technology.

Another concern of conference attendees was the responsibility of scientists to earn the public's trust. Some conferees suggested that scientists had mainly themselves to blame for any problems in the public's view of science. They felt scientists must pay more attention to the moral implications of their work and the uses to which others put it. However, the concern that came across most forcefully was that the continued health of our democratic society will depend more and more on having a citizenry that is informed about science and technology and that can reason effectively on such issues.

The conference ended with a speech by physics Nobel laureate Leon Lederman. He summed up the thoughts that united most of the scientists and scholars who attended:

> We have a three-hundred-year commitment to rationality. This is the crucial point. It's too late to go back to an earlier world. We have huge problems ahead of us: poverty, despair, environmental pollution, overpopulation. We will need all the rationality we can summon to steer the world into a safe harbor. □

Science, Delusion, and the Appetite for Wonder

Science runs the gamut from the tantalizingly surprising to the deeply strange. It is well qualified to feed our human need for wonder and mystery.

RICHARD DAWKINS

You could give Aristotle a tutorial. And you could thrill him to the core of his being. Aristotle was an encyclopedic polymath, an all-time intellect. Yet not only can you know more than Aristotle about the world; you also can have a deeper understanding of how everything works. Such is the privilege of living after Newton, Darwin, Einstein, Planck, Watson, Crick, and their colleagues.

I'm not saying you're more *intelligent* than Aristotle, or wiser. For all I know, Aristotle's the cleverest person who ever lived. That's not the point. The point is only that science is cumulative, and we live later.

Aristotle had a lot to say about astronomy, biology, and physics. But his views sound weirdly naive today. Not as soon as we move away from science, however. Aristotle could walk straight into a modern seminar on ethics, theology, or political or moral philosophy, and contribute. But let him

walk into a modern science class, and he'd be a lost soul, not because of the jargon, but because science advances, cumulatively.

Here's a small sample of the things you could tell Aristotle, or any other Greek philosopher, and surprise and enthral him, not just with the facts themselves, but with how they hang together so elegantly.

The Earth is not the center of the universe. It orbits the Sun—which is just another star. There is no music of the spheres, but the chemical elements, from which all matter is made, arrange themselves cyclically, in something like octaves. There are not four elements but about one hundred. Earth, air, fire, and water are not among them.

Living species are not isolated types with unchanging essences. Instead, over a time scale too long for humans to imagine, they split and diverge into new species, which then go on diverging further and further. For the first half of geological time our ancestors were bacteria. Most creatures still are bacteria, and each one of our trillions of cells is a colony of bacteria. Aristotle was a distant cousin to a squid, a closer cousin to a monkey, a closer cousin still to an ape (strictly speaking, Aristotle *was* an ape, an African ape, a closer cousin to a chimpanzee than a chimp is to an orangutan).

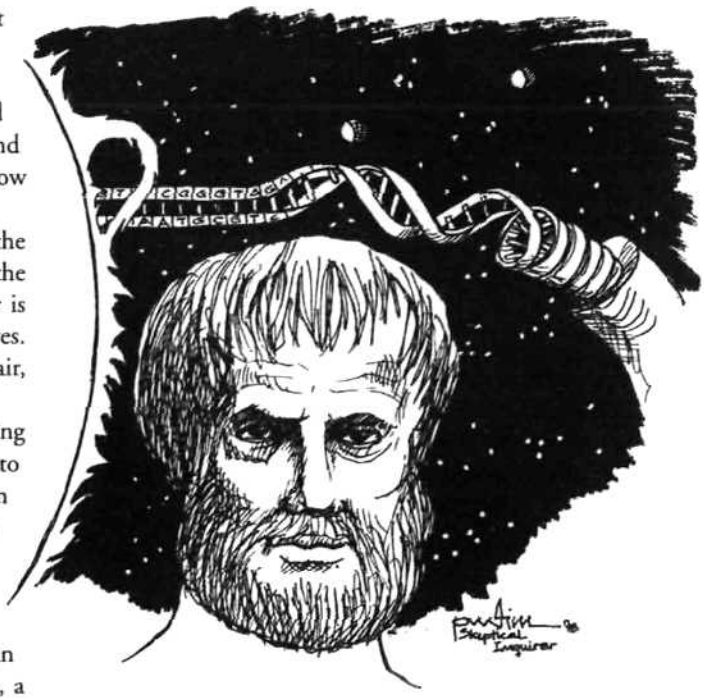
The brain is not for cooling the blood. It's what you use to do your logic and your metaphysics. It's a three-dimensional maze of a million million nerve cells, each one drawn out like a wire to carry pulsed messages. If you laid all your brain cells end to end, they'd stretch round the world twenty-five times. There are about four million million connections in the tiny brain of a chaffinch, proportionately more in ours.

Now, if you're anything like me, you'll have mixed feelings about that recitation—on the one hand, pride in what Aristotle's species now knows and didn't then; on the other hand, an uneasy feeling of, "Isn't it all a bit complacent? What about our descendants, what will they be able to tell us?"

Yes, for sure, the process of accumulation doesn't stop with us. Two thousand years hence, ordinary people who have read a couple of books will be in a position to give a tutorial to today's Aristotles: to Francis Crick, say, or Stephen Hawking. So does this mean that our view of the universe will turn out to be just as wrong?

Let's keep a sense of proportion about this! Yes, there's much that we still don't know. But surely our belief that the Earth is round and not flat, and that it orbits the Sun, will never be superseded. That alone is enough to confound those, endowed with a little philosophical learning, who deny the very possibility of objective truth: those so-called relativists who see no reason to prefer scientific views over aboriginal myths about the world.

Our belief that we share ancestors with chimpanzees, and more distant ancestors with monkeys, will never be superseded although details of timing may change. Many of our ideas, on the other hand, are still best seen as theories or models whose predictions, so far, have survived the test. Physicists disagree over whether they are condemned forever to dig for deeper mysteries, or whether physics itself will come to an end in a final "theory of everything"—a nirvana of knowledge. Meanwhile, there is so much that we don't yet understand, we should loudly proclaim those things that we do, so as to focus attention on problems that we should be working on.



Far from being over-confident, many scientists believe that science advances only by disproof of its hypotheses. Konrad Lorenz said he hoped to disprove at least one of his own hypotheses every day before breakfast. That was absurd, especially coming from the grand old man of the science of ethology, but it is true that scientists, more than others, impress their peers by admitting their mistakes.

A formative influence on my undergraduate self was the response of a respected elder statesmen of the Oxford Zoology Department when an American visitor had just publicly disproved his favorite theory. The old man strode to the front of the lecture hall, shook the American warmly by the hand, and declared in ringing, emotional tones: "My dear fellow, I wish to thank you. I have been wrong these fifteen years." And we clapped our hands red. Can you imagine a government minister being cheered in the House of Commons for a similar admission? "Resign, Resign" is a much more likely response!

Yet there is hostility towards science; and not just from the green-ink-underlining brigade, but from published novelists and newspaper columnists. Newspaper columns are notoriously ephemeral, but their drip-drip, week-after-week, or day-after-day repetition gives them influence and power, and we

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have to notice them. A peculiar feature of the British press is the regularity with which some of its leading columnists return to attack science—and not always from a vantage point of knowledge. A few weeks ago [October 11, 1996], Bernard Levin's effusion in the *Times* [London] was entitled "God, me, and Dr. Dawkins" and it had the subtitle: "Scientists don't know and nor do I—but at least I know I don't know."

It is no mean task to plumb the full depths of what Mr. Bernard Levin does not know, but here's an illustration of the gusto with which he boasts of it:

> Despite their access to copious research funds, today's scientists have yet to prove that a quark is worth a bag of beans. The quarks are coming! The quarks are coming! Run for your lives . . . ! Yes, I know I shouldn't jeer at science, noble science, which, after all, gave us mobile telephones, collapsible umbrellas, and multi-striped toothpaste, but science really does ask for it. . . . Now I must be serious. Can you eat quarks? Can you spread them on your bed when the cold weather comes?

If you want to do evil, science provides the most powerful weapons to do evil; but equally, if you want to do good, science puts into your hands the most powerful tools to do so.

It doesn't deserve a reply, but the distinguished Cambridge scientist, Sir Alan Cottrell, wrote a brief Letter to the Editor: "Sir: Mr. Bernard Levin asks 'Can you eat quarks?' I estimate that he eats 500,000,000,000,000,000,000 quarks a day."

It has become almost a cliché to remark that nobody boasts of ignorance of literature, but it is socially acceptable to boast ignorance of science and proudly claim incompetence in mathematics—in Britain, that is. I believe the same is not true of our more successful economic competitors, Germany, the United States, and Japan.

People certainly blame science for nuclear weapons and similar horrors. It's been said before but needs to be said again: if you want to do evil, science provides the most powerful weapons to do evil; but equally, if you want to do good, science puts into your hands the most powerful tools to do so. The trick is to want the right things, then science will provide you with the most effective methods of achieving them.

An equally common accusation is that science goes beyond its remit. It's accused of a grasping take-over bid for territory that properly belongs to other disciplines such as theology. On the other hand—you can't win!—listen to the novelist Fay Weldon's hymn of hate against "the scientists" in the *Daily Telegraph*:

> Don't expect us to like you. You promised us too much and failed to deliver. You never even tried to answer the questions we all asked when we were six. Where did Aunt Maud go when she died? Where was she before she was born? . . . And who cares about half a second after the Big Bang; what about half a second before? And what about crop circles?

More than some of my colleagues, I am perfectly happy to give a simple and direct answer to both those Aunt Maud questions. But I'd certainly be called arrogant and presumptuous, going beyond the limits of science.

Then there's the view that science is dull and plodding, with rows of pens in its top pocket. Here's another newspaper columnist, A. A. Gill, writing on science this year [September 8, 1996] in the *Sunday Times* [London]:

> Science is constrained by experiment results and the tedious, plodding stepping stones of empiricism. . . . What appears on television just is more exciting than what goes on in the back of it. . . . That's art, luvvie: theatre, magic, fairy dust, imagination, lights, music, applause, my public. There are stars and there are stars, darling. Some are dull, repetitive squiggles on paper, and some are fabulous, witty, thought-provoking, incredibly popular. . . .

The "dull, repetitive squiggles" is a reference to the discovery of pulsars in 1967, by Jocelyn Bell and Anthony Hewish. Jocelyn Bell Burnell had recounted on television the spine-tingling moment when, a young woman on the threshold of a career, she first knew she was in the presence of something hitherto unheard-of in the universe. Not something new under the sun, a whole new *kind* of sun, which rotates so fast that, instead of taking twenty-four hours like our planet, it takes a quarter of a second. Darling, how too plodding, how madly empirical, my dear!

Could science just be too difficult for some people, and therefore seem threatening? Oddly enough, I wouldn't dare to make such a suggestion, but I am happy to quote a distinguished literary scholar, John Carey, the present Merton Professor of English at Oxford:

> The annual hordes competing for places on arts courses in British universities, and the trickle of science applicants, testify to the abandonment of science among the young. Though most academics are wary of saying it straight out, the general consensus seems to be that arts courses are popular because they are easier, and that most arts students would simply not be up to the intellectual demands of a science course. [*The Faber Book of Science*, 1995]

My own view is that the sciences can be intellectually demanding, but so can classics, so can history, so can philosophy. On the other hand, nobody should have trouble understanding things like the circulation of the blood and the heart's role in pumping it round. Carey quoted Donne's lines to a class of thirty undergraduates in their final year reading English at Oxford:

> Knows't thou how blood, which to the heart doth flow,
> Doth from one ventricle to the other go?

Carey asked them how, as a matter of fact, the blood does flow. None of the thirty could answer, and one tentatively guessed that it might be "by osmosis." The truth—that the

blood is pumped from ventricle to ventricle through at least fifty miles of intricately dissected capillary vessels throughout the body—should fascinate any true literary scholar. And unlike, say, quantum theory or relativity, it isn't hard to understand. So I tender a more charitable view than Professor Carey. I wonder whether some of these young people might have been positively turned off science.

Last month I had a letter from a television viewer who poignantly began: "I am a clarinet teacher whose only memory of science at school was a long period of studying the Bunsen burner." Now, you can enjoy the Mozart concerto without being able to play the clarinet. You can be a discerning and informed concert critic without being able to play a note. Of course, music would come to a halt if nobody learned to play it. But if everybody left school thinking you had to play an instrument before you could appreciate music, think how impoverished many lives would be.

Couldn't we treat science in the same way? Yes, we must have Bunsen burners and dissecting needles for those drawn to advanced scientific practice. But perhaps the rest of us could have separate classes in science appreciation, the wonder of science, scientific ways of thinking, and the history of scientific ideas, rather than laboratory experience.

It's here that I'd seek rapprochement with another apparent foe of science, Simon Jenkins, former editor of the *Times*, and a much more formidable adversary than the other journalists I've quoted, because he has some knowledge of what he is talking about. He resents compulsory science education, and he holds the idiosyncratic view that it isn't useful. But he is thoroughly sound on the uplifting qualities of science. In a recorded conversation with me, he said:

> I can think of very few science books I've read that I've called useful. What they've been is wonderful. They've actually made me feel that the world around me is a much fuller . . . much more awesome place than I ever realised it was. . . . I think that science has got a wonderful story to tell. But it isn't useful. It's not useful like a course in business studies or law is useful, or even a course in politics and economics.

Far from science not being useful, my worry is that it is so useful as to overshadow and distract from its inspirational and cultural value. Usually even its sternest critics concede the usefulness of science, while completely missing the wonder. Science is often said to undermine our humanity, or destroy the mystery on which poetry is thought to thrive. Keats berated Newton for destroying the poetry of the rainbow.

> Philosophy will clip an Angel's wings,
> Conquer all mysteries by rule and line,
> Empty the haunted air, and gnomed mine —
> Unweave a rainbow . . .

Keats was, of course, a very young man. Blake, too, lamented:

> For Bacon and Newton, sheath'd in dismal steel, their terrors hang
> Like iron scourges over Albion; Reasonings like vast Serpents Infold around my limbs. . . .

I wish I could meet Keats or Blake to persuade them that mysteries don't lose their poetry because they are solved. Quite the contrary. The solution often turns out more beautiful than the puzzle, and anyway the solution uncovers deeper mystery. The rainbow's dissection into light of different wavelengths leads on to Maxwell's equations, and eventually to special relativity.

Einstein himself was openly ruled by an aesthetic scientific muse: "The most beautiful thing we can experience is the mysterious. It is the source of all true art and science," he said. It's hard to find a modern particle physicist who doesn't own to some such aesthetic motivation. Typical is John Wheeler, one of the distinguished elder statesmen of American physics today:

> . . . we will grasp the central idea of it all as so simple, so beautiful, so compelling that we will all say each to the other, "Oh, how could it have been otherwise! How could we all have been so blind for so long!"

Wordsworth might have understood this better than his fellow romantics. He looked forward to a time when scientific discoveries would become "proper objects of the poet's art." And, at the painter Benjamin Haydon's dinner of 1817, he endeared himself to scientists, and endured the taunts of Keats and Charles Lamb, by refusing to join in their toast: "Confusion to mathematics and Newton."

Mysteries don't lose their poetry because they are solved. Quite the contrary. The solution often turns out more beautiful than the puzzle . . .

Now, here's an apparent confusion: T. H. Huxley saw science as "nothing but trained and organized common sense," while Professor Lewis Wolpert insists that it's deeply paradoxical and surprising, an affront to common sense rather than an extension of it. Every time you drink a glass of water, you are probably imbibing at least one atom that passed through the bladder of Aristotle. A tantalizingly surprising result, but it follows by Huxley-style organized common sense from Wolpert's observation that "there are many more molecules in a glass of water than there are glasses of water in the sea."

Science runs the gamut from the tantalizingly surprising to the deeply strange, and ideas don't come any stranger than quantum mechanics. More than one physicist has said something like: "If you think you understand quantum theory, you don't understand quantum theory."

There is mystery in the universe, beguiling mystery, but it isn't capricious, whimsical, frivolous in its changeability. The universe is an orderly place and, at a deep level, regions of it behave like other regions, times behave like other times. If you put a brick on a table, it stays there unless something lawfully moves it, even if you meanwhile forget it's there. Poltergeists

and sprites don't intervene and hurl it about for reasons of mischief or caprice. There is mystery, but not magic; strangeness beyond the wildest imagining, but no spells or witchery, no arbitrary miracles.

Even science fiction, though it may tinker with the laws of nature, can't abolish lawfulness itself and remain good science fiction. Young women don't take off their clothes and spontaneously morph themselves into wolves. A recent television drama is fairy tale rather than science fiction, for this reason. It falls foul of a theoretical prohibition much deeper than the philosopher's "All swans are white—until a black one turns up" inductive reasoning. We know people can't metamorphose into wolves, not because the phenomenon has never been observed—plenty of things happen for the first time—but because werewolves would violate the equivalent of the second law of thermodynamics. Of this, Sir Arthur Eddington said:

> If someone points out to you that your pet theory of the universe is in disagreement with Maxwell's equations—then so much the worse for Maxwell's equations. If it is found to be contradicted by observation—well, these experimentalists do bungle things sometimes. But if your theory is found to be against the second law of thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation. [*The Nature of the Physical World*, 1928, Ch. 14]

To pursue the relationship between werewolves and entropy would take me too far afield. But, since this lecture commemorates a man [Richard Dimbleby] whose integrity and honesty as a broadcaster is still an abiding legend thirty years after his death, I'll stay for a moment with the current epidemic of paranormal propaganda on television.

In one popular type of programming, conjurers come on and do routine tricks. But instead of admitting that they are conjurers, these television performers claim genuinely supernatural powers. In this, they are abetted by prestigious, even knighted, presenters, people whom we have got into the habit of trusting, broadcasters who have become role models. It is an abuse of what might be called the Richard Dimbleby Effect.

In other programs, disturbed people recount their fantasies of ghosts and poltergeists. But instead of sending them off to a kindly psychiatrist, television producers eagerly hire actors to re-create their delusions—with predictable effects on the credulity of large audiences.

Recently, a faith healer was given half an hour of free prime-time television, to advertise his bizarre claim to be a 2,000-year-dead physician called Paul of Judea. Some might call this entertainment, comedy even, though others would find it objectionable entertainment, like a fairground freak show.

Now, I obviously have to return to the arrogance problem. How can I be so sure that this ordinary Englishman with an unlikely foreign accent was not the long-dead Paul of Judea? How do I know that astrology doesn't work? How can I be so confident that the television "supernaturalists" are ordinary conjurers, just because ordinary conjurers can replicate their tricks? (Spoon-bending, by the way, is so routine a trick that the American conjurers Penn and Teller have posted instructions for doing it on the Internet! See http://www.randi.org/jr/ptspoon.html).

It really comes down to parsimony, economy of explanation. It is possible that your car engine is driven by psychokinetic energy, but if it looks like a petrol engine, smells like a petrol engine, and performs exactly as well as a petrol engine, the sensible working hypothesis is that it is a petrol engine. Telepathy and possession by the spirits of the dead are not ruled out as a matter of principle. There is certainly nothing impossible about abduction by aliens in UFOs. One day it may happen. But on grounds of probability, it should be kept as an explanation of last resort. It is unparsimonious, demanding more than routinely weak evidence before we should believe it. If you hear hooves clip-clopping down a London street, it could be a zebra or even a unicorn, but, before we assume that it's anything other than a horse, we should demand a certain minimal standard of evidence.

Let's not go back to a dark age of superstition and unreason, a world in which every time you lose your keys you suspect poltergeists, demons, or alien abduction.

It's been suggested that if the supernaturalists really had the powers they claim, they'd win the lottery every week. I prefer to point out that they could also win a Nobel Prize for discovering fundamental physical forces hitherto unknown to science. Either way, why are they wasting their talents doing party turns on television?

By all means let's be open-minded, but not so open-minded that our brains drop out. I'm not asking for all such programs to be suppressed, merely that the audience should be encouraged to be critical. In the case of the psychokineticists and thought-readers, it would be good entertainment to invite studio audiences to suggest critical tests, which only genuine psychics, but not ordinary conjurers, could pass. It would make a good, entertaining form of quiz show.

How do we account for the current paranormal vogue in the popular media? Perhaps it has something to do with the millennium—in which case it's depressing to realize that the millennium is still [two] years away. Less portentously, it may be an attempt to cash in on the success of *The X-Files*. This is fiction and therefore defensible as pure entertainment.

A fair defense, you might think. But soap operas, cop series, and the like are justly criticized if, week after week, they ram home the same prejudice or bias. Each week *The X-Files* poses a mystery and offers two rival kinds of explanation, the rational theory and the paranormal theory. And, week after week, the rational explanation loses. But it is only fiction, a bit of fun, why get so hot under the collar?

Imagine a crime series in which, every week, there is a white suspect and a black suspect. And every week, lo and behold, the black one turns out to have done it. Unpardonable, of

course. And my point is that you could not defend it by saying: "But it's only fiction, only entertainment."

Let's not go back to a dark age of superstition and unreason, a world in which every time you lose your keys you suspect poltergeists, demons, or alien abduction.

Enough. Let me turn to happier matters. The popularity of the paranormal, oddly enough, might even be grounds for encouragement. I think that the appetite for mystery, the enthusiasm for that which we do not understand, is healthy and to be fostered. It is the same appetite which drives the best of true science, and it is an appetite which true science is best qualified to satisfy. Perhaps it is this appetite that underlies the ratings success of the paranormalists.

I believe that astrologers, for instance, are playing on—misusing, abusing—our sense of wonder. I mean when they hijack the constellations and employ sub-poetic language like "the moon moving into the fifth house of Aquarius." Real astronomy is the rightful proprietor of the stars and their wonder. Astrology gets in the way, even subverts and debauches the wonder.

To show how real astronomical wonder can be presented to children, I'll borrow from a book called *Earthsearch* by John Cassidy, which I brought back from America to show my daughter Juliet. Find a large open space and take a soccer ball to represent the Sun. Put the ball down and walk ten paces in a straight line. Stick a pin in the ground. The head of the pin stands for the planet Mercury. Take another nine paces beyond Mercury and put down a peppercorn to represent Venus. Seven paces on, drop another peppercorn for Earth. One inch away from Earth, another pinhead represents the Moon, the furthest place, remember, that we've so far reached. Fourteen more paces to little Mars, then ninety-five paces to giant Jupiter, a ping-pong ball. One hundred and twelve paces further, Saturn is a marble. No time to deal with the outer planets except to say that the distances are much larger. But, how far would you have to walk to reach the nearest star, Proxima Centauri? Pick up another soccer ball to represent it, and set off for a walk of 4,200 miles. As for the nearest other galaxy, Andromeda, don't even think about it!

Who'd go back to astrology when they've sampled the real thing—astronomy, Yeats's "starry ways," his "lonely, majestical multitude"? The same lovely poem encourages us to "Remember the wisdom out of the old days," and I want to end with a little piece of wonder from my own territory of evolution.

You contain a trillion copies of a large, textual document written in a highly accurate, digital code, each copy as voluminous as a substantial book. I'm talking, of course, of the DNA in your cells. Textbooks describe DNA as a blueprint for a body. It's better seen as a recipe for making a body, because it is irreversible. But today I want to present it as something different again, and even more intriguing. The DNA in you is a coded description of ancient worlds in which your ancestors lived. DNA is the wisdom out of the old days, and I mean very old days indeed.

The oldest human documents go back a few thousand years, originally written in pictures. Alphabets seem to have been invented about thirty-five centuries ago in the Middle East, and they've changed and spawned numerous varieties of alphabet since then. The DNA alphabet arose at least thirty-five *million* centuries ago. Since that time, it hasn't changed one jot. Not just the alphabet, the dictionary of sixty-four basic words and their meanings is the same in modern bacteria and in us. Yet the common ancestor from whom we both inherited this precise and accurate dictionary lived at least thirty-five million centuries ago.

What changes is the long programs that natural selection has written using those sixty-four basic words. The messages that have come down to us are the ones that have survived millions, in some cases hundreds of millions, of generations. For every successful message that has reached the present, countless failures have fallen away like the chippings on a sculptor's floor. That's what Darwinian natural selection means. We are the descendants of a tiny élite of successful ancestors. Our DNA has proved itself successful, because it is here. Geological time has carved and sculpted our DNA to survive down to the present.

There are perhaps thirty million distinct species in the world today. So, there are thirty million distinct ways of making a living, ways of working to pass DNA on to the future. Some do it in the sea, some on land. Some up trees, some underground. Some are plants, using solar panels—we call them leaves—to trap energy. Some eat the plants. Some eat the herbivores. Some are big carnivores that eat the small ones. Some live as parasites inside other bodies. Some live in hot springs. One species of small worms is said to live entirely inside German beer mats [coasters]. All these different ways of making a living are just different tactics for passing on DNA. The differences are in the details.

Just study what is, and you'll find that it already is far more uplifting than anything you could imagine needing.

The DNA of a camel was once in the sea, but it hasn't been there for a good 300 million years. It has spent most of recent geological history in deserts, programming bodies to withstand dust and conserve water. Like sand bluffs carved into fantastic shapes by the desert winds, camel DNA has been sculpted by survival in ancient deserts to yield modern camels.

At every stage of its geological apprenticeship, the DNA of a species has been honed and whittled, carved and rejigged by selection in a succession of environments. If only we could read the language, the DNA of tuna and starfish would have *sea* written into the text. The DNA of moles and earthworms would spell *underground*. Of course, all the DNA would spell many other things as well. Shark and cheetah DNA would spell *hunt*, as well as separate messages about sea and land.

DAWKINS

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A Mind at Play

An Interview with Martin Gardner

KENDRICK FRAZIER

His mind is highly philosophical, at home with the most abstract concepts, yet his thinking and writing crackle with clarity—lively, crisp, vivid. He achieved worldwide fame and respect for the three decades of his highly popular mathematical games column for *Scientific American*, yet he is not a mathematician. He is by every standard an eminent intellectual, yet he has no Ph.D. or academic position. He has a deep love of science and has written memorable science books (*The Ambidextrous Universe* and *The Relativity Explosion*, for instance), and yet he has devoted probably more time and effort to—and has been more effective than any thinker of the twentieth century in—exposing pseudoscience and bogus science.

He is considered a hard-nosed, blunt-speaking scourge of paranormalists and all who would deceive themselves or the public in the name of science, yet in person he is a gentle, soft-spoken, even shy man who likes nothing better than to stay in his home with his beloved wife Charlotte in

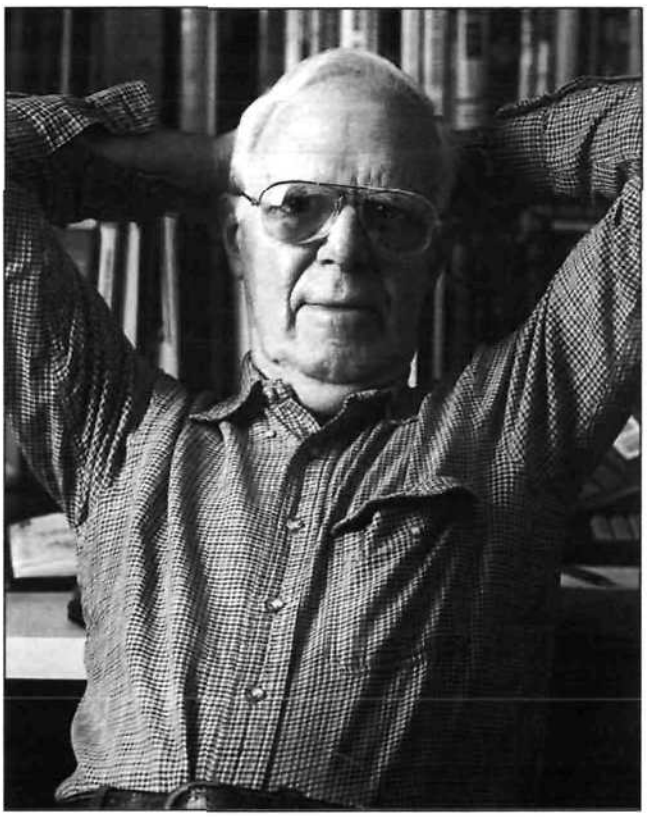
Hendersonville, North Carolina, and write on his electric typewriter.

His critics see him as serious, yet he has a playful mind, is often more amused than outraged by nonsense, and believes with Mencken that "one horselaugh is worth ten thousand syllogisms." He is deeply knowledgeable about conjuring and delights in learning new magic tricks. He retired from *Scientific American* more than fifteen years ago, but his output of books, articles, and reviews has, if anything, accelerated since then. (He's now written more than sixty books, and more are in the works.) His knowledge and interests span the sciences, philosophy, mathematics, and religion, yet he professes no special standing as a Renaissance man. He has received major awards from scientific societies and praise from some of the nation's leading scholars ("One of the great intellects produced in this country in this century," says Douglas Hofstadter), some of whom forthrightly consider him an intellectual hero, yet he remains modest about his contributions.

At eighty-three, Martin Gardner reigns supreme as the leading light of the modern skeptical movement. More than four and a half decades ago, in 1952, he wrote the first classic book on modern pseudoscientists and their views, *Fads and Fallacies in the Name of Science*, and today it remains in print and widely available as a Dover paperback and is as relevant as ever. It has influenced and inspired generations of scientists, scholars, and nonscientists. He followed that up in 1981 with *Science: Good, Bad, and Bogus*. In an essay in the *New York Review of Books* entitled "Quack Detector," Stephen Jay Gould welcomed the book and said Martin Gardner "has become a priceless national resource," a writer "who can combine wit, penetrating analysis, sharp prose, and sweet reason into an expansive view that expunges nonsense without stifling innovation, and that presents the excitement and humanity of science in a positive way." After that, in the same genre, came *The New Age: Notes of a Fringe-Watcher* (1988), *On the Wild Side* (1992), and *Weird Water and Fuzzy Logic: More Notes of a Fringe-Watcher* (1996).

The subtitles refer of course to his column "Notes of a Fringe-Watcher" (broadened from its original title, "Notes of a Psi-Watcher"), which has graced the pages of the SKEPTICAL INQUIRER every issue since Summer 1983. His first *SI* column, "Lessons of a Landmark PK Hoax," dealt with James Randi's then-just-revealed Project Alpha experiment, in which Randi planted two young magicians in a parapsychology laboratory to see if the lead investigator could detect their trickery. The three Gardner anthologies each consist of half *SI* columns and half reviews and writings for other publications.

When the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP), publisher of the SKEPTICAL INQUIRER, was established in 1976, Martin Gardner was one of its original founding fellows, and he has remained a member of its Executive Council and Editorial Board ever since. When offered the opportunity fifteen years ago to write a regular column for *SI*, he quickly agreed. He dedicated *The New Age* anthology to CSICOP's founder and chairman: "To Paul Kurtz, a friend whose vision, courage, and integrity started it all." Although Martin Gardner seldom travels to CSICOP meetings, he remains, through his personal contacts, insights, published writings, and voluminous correspondence, a profound influence on CSICOP, modern skepticism, and intellectual discourse broadly.



He answered questions posed by SKEPTICAL INQUIRER Editor Kendrick Frazier.

***SI:** In your book of essays* The Night Is Large: Collected Essays 1938–1995, *you organized your lifelong intellectual interests into seven categories: physical science, social science, pseudoscience, mathematics, the arts, philosophy, and religion. Do they have equal importance to you? How do you rank them in importance or interest—to you? to others? Do you see them as complementary aspects of one coherent worldview, or are some separate?*

Gardner: My main interests are philosophy and religion, with special emphasis on the philosophy of science. I majored in philosophy at the University of Chicago (class of 1936), having entered the freshman class as a Protestant fundamentalist from Tulsa. I quickly lost my entire faith in Christianity. It was a painful transition that I tried to cover in my semi-autobiographical novel *The Flight of Peter Fromm* (now a Prometheus Books paperback). I actually doubted the theory of evolution, having been influenced by George McCready Price, a Seventh-day Adventist creationist. A course in geology convinced me that Price was a crackpot. However, his flood theory of fossils is ingenious enough so that one has to know some elementary geology in order to see where it is wrong. Perhaps this aroused my interest in debunking pseudoscience.

After I returned from four years in the Navy as a yeoman,

I returned to Chicago and would have gone back to my former job in the university's press relations office had I not sold a humorous short story to *Esquire*. This was my first payment for anything I'd written. It persuaded me to see if I could survive as a freelancer, and for the next year or two I lived on income from sales of fiction to *Esquire*. My second sale was a story based on topology titled "The No-Sided Professor." It was my first effort at science fiction.

While freelancing, I took a seminar (using GI bill funds) from the famous Viennese philosopher of science Rudolf Carnap. It was the most exciting course I ever took. Years later I persuaded Carnap to have the course tape-recorded by his wife and to let me shape the recording into a book. Basic Books issued it under the title *Philosophical Foundations of Physics*. The title was later changed to *Introduction to the Philosophy of Science*. All the ideas in the book are Carnap's, all the wording mine. Dover recently reprinted it in paperback with an afterword about how the book came about and my memories of Carnap. During the writing of this book, I exchanged many pleasant letters with Mrs. Carnap, but before the book was published, for reasons unknown to me, she killed herself by hanging.

Carnap had a major influence on me. He persuaded me that all metaphysical questions are "meaningless" in the sense that they cannot be answered empirically or by reason. They can be defended only on emotive grounds. Carnap was an atheist, but I managed to retain my youthful theism in the form of what is called "fideism." I like to call it "theological positivism," a play on Carnap's "logical positivism."

Shortly before he died, Carl Sagan wrote to say he had reread my *Whys of a Philosophical Scrivener* and was it fair to say that I believed in God solely because it made me "feel good." I replied that this was exactly right, though the emotion was deeper than the way one feels good after three drinks. It is a way of escaping from a deep-seated despair. William James's essay "The Will to Believe" is the classic defense of the right to make such an emotional "leap of faith." My theism is independent of any religious movement, and in the tradition that starts with Plato and includes Kant, and a raft of later philosophers, down to Charles Peirce, William James, and Miguel de Unamuno. I defend it *ad nauseam* in my *Whys*.

SI: How have you managed to retain such a phenomenal breadth of interest and knowledge?

Gardner: Philosophy gives one an excuse to dabble in everything. Although my interests are broad, they seldom get beyond elementary levels. I give the impression of knowing far more than I do because I work hard on research, write glibly, and keep extensive files of clippings on everything that interests me.

There are big gaps in my knowledge, one of the largest of which is classical music. I have a poor ear. My tastes run to Dixieland jazz and melodies I am able to hum and play on a musical saw (one of my minor self-amusements). I know nothing about sports other than baseball. I have never played a game of golf or seen a horse race. I never watch football or basketball. I think boxing should be outlawed as too primitive and cruel. Ditto for Spanish bullfighting.

In high school I was on the gymnastic team (specializing in the horizontal bar), and I played lots of tennis. I would enjoy tennis today except that I had cataract surgery early in life. Without eye lenses, one cannot continually alter one's focus, so there is no way to anticipate exactly where the ball is as it comes toward you.

SI: Do you wish you had pursued one field more, to the exclusion of the others?

Gardner: I'm glad I majored in philosophy, though had I known I would be writing some day a column on math, I would have taken some math courses. As it was, I took not a single math course. If you look over my *Scientific American* columns you will see that they get progressively more sophisticated as I began reading math books and learning more about the subject. There is no better way to learn *anything* than to write about it!

SI: You probably could have been either a philosopher or a mathematician—which a lot of fans of your Scientific American *recreational mathematics columns probably thought you were. Did you ever think about going into academia?*

Gardner: Early on in college I decided I wanted to be a writer, not a teacher, and I have never regretted this decision. It is the reason I took only one year of graduate work, and never cared to go for a master's.

SI: Given your breadth and variety of interests, how would you describe yourself — your professional field?

Gardner: I think of myself as a journalist who writes mainly about math and science, and a few other fields of interest.

SI: I appreciate the becoming modesty, but I think you may be too self-effacing. Douglas Hofstadter has said, "Martin Gardner is one of the greatest intellects produced in this country in this century." Stephen Jay Gould has said you have been "the single brightest beacon defending rationality and good science against the mysticism and anti-intellectualism that surround us." Certainly you must be pleased to be so highly regarded.

Gardner: Yes, I *am* pleased, though Hofstadter, a good friend, surely exaggerates, and ditto for Gould, a marvelous writer I hope to meet some day.

SI: What do you consider to be the relationship between your interests in writing about science and in debunking pseudoscience? Which has more appeal to you?

Gardner: In a way, I regret spending so much time debunking bad science. A lot of it is a waste of time. I much more enjoyed writing the book with Carnap, or *The Ambidextrous Universe*, and other books about math and science.

SI: What motivates you? You have been writing on pseudoscience and fringe-science since at least 1950. The Washington Post *reviewer of* The Night Is Large *described you—correctly, I think—as "almost certainly the most eminent debunker of pseudoscience since World War II." Do you find pseudoscience and paranormal claims inherently fascinating—you seem both wryly amused and deeply concerned—or do you consider critiquing them more a task that has to be done? If the latter, what keeps you going at it?*

Gardner: I'm not sure why I enjoy debunking. Part of it

surely is amusement over the follies of true believers, and partly because attacking bogus science is a painless way to learn good science. You have to know something about relativity theory, for example, to know where opponents of Einstein go wrong. You have to know something about probability and statistics to recognize Michael Drosnin's *The Bible Code* as hogwash. You have to know the power of the placebo and faith to see why Mary Baker Eddy is the very model of a quack.

Another reason for debunking is that bad science contributes to the steady dumbing down of our nation. Crude beliefs get transmitted to political leaders and the result is considerable damage to society. We see this happening now in the rapid rise of the religious right and how it has taken over large segments of the Republican Party. I think fundamentalist and Pentecostalist Pat Robertson is a far greater menace to America than, say, Jesse Helms who will soon be gone and forgotten.

I am happy to see the job of debunking bad science being taken over by others, especially by scientists like the late Carl Sagan who came to realize the importance of speaking up. I am delighted that Philip Klass is doing such a good job on UFO nonsense because it allows me to avoid this dismal topic. I was tempted to wade into *The Bible Code*. Now I don't need to after reading Dave Thomas's definitive blast in the SKEPTICAL INQUIRER [November/December 1997].

SI: You are generally considered one of the harshest critics of the paranormal and its proponents. How would you characterize your position?

Gardner: I like to think I am unduly harsh and dogmatic only when writing about a pseudoscience that is far out on the continuum that runs from good science to bad, and when I am expressing the views of all the experts in the relevant field. Where there are areas on the fringes of orthodoxy, supported by respected scientists, I try to be more agnostic. I am certain, for example, that astrology and homeopathy are totally worthless, but I have no strong opinions about, say, superstring theory. Superstrings are totally lacking in empirical support, yet they offer an elegant theory with great explanatory power. I wish I could be around fifty years from now to know whether superstrings turn out to be a fruitful theory or whether they are just another blind alley in the search for a "theory of everything."

There are dozens of monumental questions about which I have to say "I don't know." I don't know whether there is intelligent life elsewhere in the universe, or whether life is so improbable that we are truly alone in the cosmos. I don't know whether there is just one universe, or a multiverse in which an infinite number of universes explode into existence, live and die, each with its own set of laws and physical constants. I don't know if quantum mechanics will someday give way to a deeper theory. I don't know whether there is a finite set of basic laws of physics or whether there are infinite depths of structure like an infinite set of Chinese boxes. Will the electron turn out to have an interior structure? I wish I knew!

I *can* say this. I believe that the human mind, or even the mind of a cat, is more interesting in its complexity than an entire galaxy if it is devoid of life. I belong to a group of thinkers known as the "mysterians." It includes Roger Penrose, Thomas Nagel, John Searle, Noam Chomsky, Colin McGinn, and many others who believe that no computer, of the kind we know how to build, will ever become self-aware and acquire the creative powers of the human mind. I believe there is a deep mystery about how consciousness emerged as brains became more complex, and that neuroscientists are a long long way from understanding how they work.

SI: What trends have you seen in popular belief in pseudoscience and the paranormal in the past half century? Has it gotten better or worse? What are your greatest concerns?

Gardner: I think popular belief in bogus sciences is steadily increasing. When I was a boy, there were only one or two astrologers who wrote newspaper columns. Now almost every paper except the *New York Times*, not to mention dozens of magazines, features a horoscope column. Professional astrologers now outnumber astronomers. For Pete's sake, a president of the United States and his first lady were astrology buffs! This would have seemed unthinkable a hundred years ago.

Alternative medical views are growing rapidly, especially on college campuses where more students are relying on homeopathic remedies than ever in history. Real tragedies occur when persons avoid sound medical help and rely on worthless claims.

I believe that the human mind, or even the mind of a cat, is more interesting in its complexity than an entire galaxy if it is devoid of life.

SI: What do you see for the future in that regard?

Gardner: I see the immediate future as having a steady increase in superstitions. Fundamentalism, especially the Pentecostal variety, is growing rapidly, not only here but in other nations, notably in South America. And not only among Protestants but also among Catholics and Jews. The Catholic Church is on the brink of its greatest blunder since it condemned Galileo. It is close to declaring that Mary is a "coredeemer" with Christ! (Mother Teresa was a strong supporter of this.) Of course, if the pope declares infallibly that this doctrine is true, it will kill the ecumenical movement.

Did you know that Dr. Raymond Damadian, the distinguished inventor of magnetic resonance imaging (the MRI test), has declared himself a creationist and a young-Earther?

SI: Apart from popular *belief in pseudoscience, how about what we might call experimental parapsychology—work done by Ph.D.'s in the laboratory that some keep pointing to as evidence of ESP or PK—going back to J. B. Rhine's experiments in the 1930s and 1940s and most recently the ganzfeld experiments, the persistent claims about remote viewing, and Robert Jahn's random-number-generator work? Where does all that stand in your view?*

Gardner: I'm all in favor of parapsychologists continuing to look for evidence of psi, and their experiments certainly are more carefully controlled than in the days of Rhine. It has often been pointed out that as Rhine slowly learned how to tighten his controls, his evidence of psi became weaker and

weaker. However, the evidence will not become convincing to other psychologists until an experiment is made that is repeatable by skeptics. So far, no such experiment has been made. Jahn's evidence for psi is statistical, and there are many ways his statistics, which favor psi to a very slight degree, can be unconsciously biased. As far as I know, no one else has been able to duplicate his computer-generated results.

SI: Are you discouraged by the rejection of science in certain parts of academia heavily influenced by the postmodernist antipathy toward science and reason? The Sokal hoax, which you wrote about so amusingly, certainly exposed that movement's scientific vacuuousness.

Gardner: Yes, I am dismayed by the increasing effort of the postmoderns to view science as a solely cultural phenomenon rather than as a highly successful and ongoing search for objective truths about the universe. No one wants to deny that science is corrigible, but it is a wonderfully successful self-correcting process that gets ever closer to objective truth. Postmodern nonsense has even invaded mathematics, as witnessed by Reuben Hersh's just-published book *What Is Mathematics, Really?* I have a lengthy critical review of this book in the *Los Angeles Times Book Review* (October 12, 1997), defending the opinion of almost all mathematicians today or in the past that mathematics has a curious kind of reality independent of human minds. The universe is made of particles and fields about which nothing can be said except to describe their mathematical structures. In a sense, the entire universe is made of mathematics. If the particles and fields are *not* made of mathematical structure, then please tell me what you think they are made of!

SI: When you wrote the book Fads and Fallacies in the Name of Science, *did you expect that it would become the classic it has become?*

Gardner: No, I never expected *Fads and Fallacies* would long remain in print. The first edition, titled *In the Name of Science*, sold so poorly that Putnam quickly remaindered it. Not until Dover picked it up did its sales take off, thanks in large degree to Long John Nebel, then a popular all-night radio talk-show host. For many months, he had guests on almost every night to attack the book. I remember one night, when I had gotten out of bed to change a diaper on our first born, I turned on the radio and heard John Campbell, then editor of *Astounding Science Fiction*, say "Mr. Gardner is a liar." I had a chapter about his role in introducing L. Ron Hubbard's dianetics. Campbell claimed it had cured his sinusitis. I never dreamed that Scientology would last more than a few years, because its claims were so preposterous. It maintained, for example (and still does), that immediately after conception, long before the embryo develops ears, it makes recordings (called engrams) of all the words spoken by or to the mother! I would never have dreamed that UFOs, to which I also devoted a chapter, would become a mania that would increase steadily over the next half century. I expected Wilhelm Reich's orgone therapy to be short lived, yet it is still going strong. Come to think of it, phrenology is the only major pseudoscience I know about that once flourished around the world and has since faded away.

SI: Which of your own books are your favorites? Which have been most popular? Which are most important?

Gardner: Of my books, the one that I am most pleased to have written is my confessional, *The Whys of a Philosophical Scrivener*, with my novel about Peter Fromm running second.

SI: And which of your books have been the most popular, have sold best? Which do you think have been the most influential?

Gardner: The one book of mine that has sold the most copies is far and away my *Annotated Alice*. It has never been out of print since it was published in 1960, and has now sold over a million copies in hard- and soft-cover editions here and in England. Of my books about pseudoscience, I suppose the first one, now titled *Fads and Fallacies in the Name of Science*, has been the most influential on later writing about similar topics.

SI: Whatever you write about, you seem always to call on great storehouses of specific information—journal papers, magazine articles, newspaper clippings, etc., going back decades. I've heard Randi describe with some awe your filing system. Can you tell us about it?

Gardner: Yes, my files are my number one trade secret. It began in college with 3 × 5 file cards that I kept in ladies shoe boxes. I had a habit then (this was before copy machines) of destroying books by slicing out paragraphs and pasting them on cards. A friend once looked through my cards on American literature and was horrified to discover I had destroyed several rare first editions of books by Scott Fitzgerald.

When I began to earn some money I moved the cards into metal file cabinets, and started to preserve complete articles and large clippings and correspondence in manila folders. These folders are now in some twenty cabinets of four or five drawers each. And I have a large library of reference books that save me trips to the library. I have not yet worked up enough courage to go on line for fear I would waste too much time surfing the Internet.

SI: How do you manage to keep up with everything?

Gardner: I keep up my interests by taking scores of periodicals that deal with topics I may write about, especially science and math journals. I have been a lifelong subscriber to *Science News*, which you once edited. I could never have written my *Scientific American* columns without access to math magazines that ran articles and problems that could be considered recreational in nature.

SI: For as world-famous and respected as you are—your writings have been inspirational to two generations of prominent scientists and scholars—you usually have worked alone. You seldom, if ever, go to conferences or meetings. Only a few of your many fans and readers have ever seen or heard you in person. Why? Has this been an advantage to you—no distractions, for instance—more time for writing? Have there been drawbacks to this solitary work style?

Gardner: I have often been called shy, and with justification. I prefer one-to-one relationships to crowds. I hate going to parties or giving speeches. I love monotony. Nothing pleases me more than to be alone in a room, reading a book or hitting

typewriter keys. I consider myself lucky in being able to earn a living by doing what I like best. As my wife long ago realized, I really don't do any *work*. I just *play* all the time, and am fortunate enough to get paid for it.

SI: You seem to be curious about everything. What most delights you? Scientifically? Professionally? Personally?

Gardner: I am most delighted by learning something new and significant. (I leave aside the delights of relationships with my wife, with relatives, and with friends). This year I had the pleasure of updating and expanding a 1910 book by Sylvanus Thompson called *Calculus Made Easy*. It was a great pleasure to learn, for the first time, some basic calculus, and to appreciate fully its enormous elegance and power.

Next to learning something about science or math that I didn't know before, my next greatest pleasure is learning a newly invented magic trick. Conjuring has been a hobby since I was a boy. Some of the best magic tricks operate on scientific or mathematical principles. One of my earliest books, *Mathematics, Magic and Mystery* (still in print as a Dover paperback) deals with this overlap of magic and math.

Let me give one example. Arrange the cards in a deck so they alternate blacks and reds. Cut the deck in half, making sure the bottom cards of each half are of opposite color. Riffle shuffle the halves together once, making the shuffle as careless or thorough as you please. Now remove cards from the top of the deck in pairs. Each pair will contain a red and a black card! Dozens of clever card tricks have been based on this curious principle. To prove that it must work leads straight into nontrivial combinatorial theory.

SI: Many prominent skeptics are likewise knowledgeable about magic. How important is such an understanding in evaluating paranormal claims?

Gardner: I don't think a knowledge of magic is important in countering paranormal claims, except in connection with self-styled psychics who claim extraordinary paranormal powers. Such psychics use methods which have in common the methods of magicians. A man can be a great scientist, or a greater writer, and be so easily fooled by simple methods of deception that his opinions about extraordinary claims of psi powers are utterly worthless. Conan Doyle, for example, would never have believed in the genuineness of spirit mediums who levitate tables and themselves, float trumpets, produce visible spirits of the dead, exude ectoplasm through their noses, and so on, if he had had even the most superficial training in the methods of conjuring. The parapsychologists who once took Ted Serios and others like him seriously would have been spared their embarrassments had they known anything about magic. A knowledgeable magician, watching these "psychics" perform on stage, knows at once how they obtain their wonders. It is a scandal that even today so few parapsychologists think it worthwhile to study the methods of magicians before they test a psychic who performs incredible feats, then publish papers testifying to the genuineness of the psychic's powers.

An outstanding instance of this failure is John Beloff's unwillingness to learn anything about magic. Not many years ago, he wrote that the card tricks of a certain magician represented one of the strongest recent proofs of paranormal powers! When Persi Diaconis watched this magician do his simple card magic, it was perfectly obvious how he was obtaining his effects by methods well known to card magicians.

SI: You were a founding fellow of CSICOP and have been a member of the Executive Council since the beginning. How have you seen our role? What advice do you have for us for the future?

Gardner: CSICOP is obviously doing a much-needed job in combating America's dumbing down, especially in providing a source to which editors of magazines and newspapers, and the makers of TV shows can turn to get information about bogus claims. It is a role that will be increasingly important in the years ahead.

I consider myself lucky in being able to earn a living by doing what I like best.

SI: It's hard to believe you have been writing your "Notes of a Fringe-Watcher" column in SI *for almost fifteen years—especially since you didn't start it until retiring from your long-running* Scientific American *column. Do you miss doing the latter?*

Gardner: I do indeed miss writing the *Scientific American* column. I had reached a point where I could no longer keep up the column and write the books I hoped to write as long as I had my wits about me. Also, I felt it was time for younger writers to take over the column.

One of the lasting benefits of having done the column was getting to know, as personal friends, so many mathematicians, *real* mathematicians, far more knowledgeable than I, and whose work I could only dimly appreciate. It would take a page just to list their names. Another continuing pleasure is getting letters from mathematicians telling me it was my column that aroused their interest in math when they were in high school and led them to decide on math as a career.

SI: Well, we all hope you will continue writing your "Notes of a Fringe-Watcher" column in SI *for a long time to come. It clearly continues to be provocative.*

Gardner: Thanks!

SI: Your readers worldwide have been blessed by your thinking and writing over your long and prolific career, well into a time most people have retired. We all hope you can continue for a long time to come. How is your health?

Gardner: At eighty-three, I tell people I don't feel a day over seventy-five. Seriously, I have few complaints except an enlarging prostate that occasionally bothers me at night, and mild high blood pressure, which I control with Hytrin. Short-term memory is not what it used to be. My wife and I frequently spend twenty minutes at the dinner table trying to recall the name of someone we both know well until suddenly one of us shouts it out. I am fortunate in having parents who each lived into their nineties. I hope my dear wife Charlotte outlives me, although we both look forward to celebrating the arrival of the year 2000, and seeing our grandchildren become adults. □

Houdini and Conan Doyle

The Story of a Strange Friendship

The fascinating tale of the Magician and the Knight. They were both profoundly attracted by spiritualism, and yet their opinions were completely opposed.

MASSIMO POLIDORO

With the release last October of the film *Fairy Tale: A True Story*, devoted to the famous case of the Cottingley Fairies (see Sheaffer 1977; Randi 1982; Summer 1998), a new generation of cinema-goers has had a glimpse (though only in a fictional way) of the strange relationship that linked, more than seventy years ago, two most singular characters. They were Harry Houdini—master magician, escape artist, and mystifier extraordinaire—and Sir Arthur Conan Doyle—author and creator of Sherlock Holmes.

Houdini and Doyle were both profoundly interested in spiritualism; however, their views differed completely. Houdini was the skeptic, the exposer of psychic frauds; Doyle, the believer, the St. Paul of spiritualism. How these two persons became affectionate friends and then bitter enemies is a fascinating tale.

A Common Interest

Houdini posing with his book *The Unmasking of Robert-Houdin.* (Library of Congress Web site)

It all began in early 1920, when Houdini, touring the British Isles, sent Sir Arthur one of his books, *The Unmasking of Robert-Houdin.* In it, he made reference to the Davenport Brothers, two American medium-magicians who became very famous in various parts of the world, during the middle of the last century. Their specialty was the presentation of the "spirit cabinet," a wooden cabinet in which they sat and were tied securely by means of meters of rope. As soon as the cabinet doors were closed, rappings would be heard, a bell and a tambourine would play, and hands would appear at the openings of the doors. Examination of the mediums at the conclusion of the séance, or at any time during its progress, revealed the mediums tied as before.

The question was: were they genuine mediums, or clever magicians who somehow managed to free themselves from the bonds and produce the manifestations themselves? Houdini had had a chance, in 1910, to speak at length with Ira Davenport, the only surviving brother, and felt privileged to learn directly from him the clever secret of their act. They were forerunners of the escape act that later made Houdini famous, and Ira admitted to him that they had always used trickery; however, for publicity reasons, they let their audiences decide for themselves as to the true source of their sensational demonstrations.

In thanking Houdini for the book, Sir Arthur wrote that he didn't put much faith in this kind of revelation: "As to Spiritualist 'confessions,' they are all nonsense. Every famous medium is said to have 'confessed,' and it is an old trick of the opposition." He also showed that he believed in one of the oldest ruses used by fake mediums and psychics to convince onlookers of the reality of their powers, namely, that failure is proof of genuine paranormal powers (see Wiseman 1997; Polidoro, forthcoming). He wrote, in fact: "I can only learn, so far as 'exposures' goes, that there were occasions when they could not undo the knots, but as there are intermittent periods in all real mediumship, that is not against them. It is the man who could always guarantee spirit action whom I should suspect most."[1]

In various subsequent letters, Sir Arthur refers to the Davenports repeatedly, writing: "I've been reading the Davenport book you gave me. How people could imagine those men were conjurers is beyond me." And, after Houdini sent him a picture of himself with Ira, Sir Arthur wrote: ". . . you said that Ira Davenport did his phenomena by normal means. But if he did (which I really don't believe) then he is manifestly not only a liar but a blasphemer, as he went round with Mr. Ferguson, a clergyman, and mixed it all up with religion. And yet you are photographed as a friend with one whom under those circumstances, one would not touch with a muck-rake. Now, how can one reconcile that? It interests me as a problem."

Houdini, anxious to cultivate a friendship with Doyle, replied somewhat ambiguously: "I can make the positive assertion that the Davenport Brothers never were exposed," meaning that no one ever discovered their tricks. Doyle, however, preferred to interpret this as a confirmation of his beliefs, that they were never exposed because there was nothing to expose: "Unless I hear to the contrary I will take it that I may use your authoritative statement as the occasion serves."

In a further letter, Doyle went straight to the point: "I had meant to ask you, in my last, and I will do so now, whether you, with your unique experience, consider that the Davenport phenomena were clever physical tricks, or whether their claim to occult power was a true one." Houdini, again, was noncommittal: "Regarding the Davenport Brothers, I am afraid that I cannot say that all their work was accomplished by the spirits." Doyle found the reply satisfying and so their friendship started.

Skeptic and Believer Meet

It was about this time that Houdini's most profound interest in the world of spirits developed. However, he presented himself to Doyle as a long-time student of spiritualism: "I have gone out of my way for years to unearth mediums, so that I could really find a truthful representative—and regret to say that, so far, I have never witnessed a séance which had the ring of sincerity." And, in another letter: "During my tour in Australia, I met a man who was supposed to have laid low Mrs. Piper; I was in Berlin, Germany, at the trial of Miss Rothe, the flower medium; I know of the methods of the Bangs Sisters, the famous Chicago mediums; I was in court when Anna O'Delia Diss De Bar, who was mixed up with the lawyer Luther Marsh, was sentenced. . . ."

He also proposed himself to Doyle as a disciple: "You will note that I am still a sceptic, but a seeker after the Truth. I am willing to believe, if I can find a Medium who, as you suggest, will not resort to 'manipulation' when the Power does not 'arrive.'"

On April 14, they finally met at Windlesham, Doyle's country house in Crowborough, Sussex. "Visited Sir A. Conan Doyle at Crowborough," wrote Houdini in his diary. "Met Lady Doyle and the three children. Had lunch with them. They believe implicitly in Spiritualism. Sir Arthur told me he

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Conan Doyle and Houdini. (From Houdini, *Magician Among the Spirits*)

had spoken six times to his [dead] son. No possible chance for trickery. Lady Doyle also believes and has had tests that are beyond belief. Told them all to me."

Houdini, asked for Doyle's help in finding a true medium: "I am very, very anxious to have a séance with any medium with whom you could gain me an audience. I promise to go there with my mind absolutely clear, and willing to believe. I will put no obstruction of any nature whatsoever in the medium's way, and will assist in all ways in my power to obtain results." Doyle consented and arranged a number of sittings for him in London and elsewhere.

Sitting with Eva C.

The most famous séances in which Houdini participated during this period were those with the French medium "Eva C." These séances were held in London, at the rooms of the Society for Psychical Research (SPR), and Houdini was invited to participate in several of them. Eva C. (aka Eva Carrière, although her real name was Marthe Béraud) specialized in the production of "ectoplasm," which apparently emanated from her mouth and other orifices of her body. In order to study her case, and verify whether these phenomena were produced naturally or not, the SPR invited Eva to England.

Several of the sittings attended by Houdini were complete blanks: nothing happened. He tells this to Sir Arthur in a letter dated June 19, 1920: "Bagally and Dingwall [two investigators of the SPR] inform me that she has really mystified them with her manifestations, and I am rather keen to be present, and am going again Monday night." That night was, at last, rich with phenomena, as Houdini relates in this letter:

> My Dear Sir Arthur,
>
> Well, we had success at the séance last night, as far as productions were concerned, but I am not prepared to say that they were supernormal.
>
> I assure you I did not control the medium, so the suggestions were not mine. They made Mlle. Eva drink a cup of coffee and eat some cake (I presume to fill her up with some food stuff), and after she had been sewn into the tights, and a net over her face, she "manifested,"
>
> 1st. Some froth-like substance, inside of net. It was about 5 inches long; she said it was "elevating," but none of us four watchers saw it "elevate."
>
> Committee, Messrs. Feilding, Baggally, Dingwall and myself.
>
> 2nd. A white plaster-looking affair over her right eye.
>
> 3rd. Something that looked like a small face, say 4 inches in circumference. Was terra-cotta colored, and Dingwall, who held her hands, had the best look at the "object."
>
> 4th. Some substance, froth-like, "exuding from her nose." Baggally and Feilding say it protruded from her nose, but Dingwall and I are positive that it was inside of net and was not extending from her nose; I had the best view from two different places. I deliberately took advantage to see just what it was.
>
> It was a surprise effect indeed!
>
> 5th. Medium asked permission to remove something in her mouth; showed her hands empty, and took out what appeared to be a rubberish substance, which she disengaged and showed us plainly; we held the electric torch; all saw it plainly, when presto! it vanished.
>
> The séance started at 7.30 and lasted till past midnight.
>
> We went over the notes, Mr. Feilding did, and no doubt you will get a full report. I found it highly interesting.

After receiving this letter, Doyle wrote to Houdini: "That is very interesting. It is certainly on the lowest and most mechanical plane of the spiritual world, or borderline world, but at least it is beyond our present knowledge."

Houdini, however, did not reveal immediately to Doyle his further thoughts on the séance. In fact, in private he noted: "I was not in any way convinced by the demonstrations." A few years later, in his book *A Magician Among the Spirits*, he explained that he had detected the various tricks employed. He believed, for example, that the disappearance of the rubberish substance had been accomplished by sleight of hand: "I know positively that the move she made is almost identical with the manner in which I manipulate my experiment." (He was referring to the "Hindu needle trick.") In conclusion, he felt that Eva and her assistant, Mme. Bisson, were subtle tricksters: "I have no hesitation in saying that I think the two simply took advantage of the credulity and good nature of the various men with whom they had to deal."

Glimpses of Doyle's Credulity

It was about this time that Doyle became engaged in the story of the Cottingley Fairy photographs. He wrote to Houdini: "I have something far more precious: two photos, one of a goblin, the other of four fairies in a Yorkshire wood. A fake! you will say. No, sir, I think not. However, all inquiry will be made.

These I am not allowed to send. The fairies are about eight inches high. In one there is a single goblin dancing. In the other four beautiful, luminous creatures. Yes, it is a revelation."

It is, however, interesting to note that Houdini had no comment to make on this subject in any of his letters; perhaps because he could not bring himself to discuss it seriously.

Meanwhile, Sir Arthur was becoming more and more convinced that Houdini actually had some kind of supernatural powers. "I have heard of your remarkable feat in Bristol," he wrote Houdini. "My dear chap, why go around the world seeking a demonstration of the occult when you are giving one all the time? Mrs. Guppy [a well-known medium] could dematerialize, and so could many folk in Holy Writ, and I do honestly believe that you can also—in which case I again ask you why do you want demonstrations of the occult? My reason tells me that you have this wonderful power, for there is no alternative, tho' I have no doubt that, up to a point, your strength and skill avail you. . . . I am amused by your investigating with the S.P.R. Do they never think of investigating you?"

In April 1922, Doyle went to the United States to give a series of lectures on spiritualism. The lectures created a sensation, and lecture halls where Doyle appeared were always filled to capacity. His opening lecture at Carnegie Hall in New York had to be repeated seven times to satisfy all those interested. Houdini attended one of the lectures but did not discuss it with Doyle. Instead, the two men met about a month later, on May 10, when Sir Arthur and his wife went to New York to have lunch at Houdini's house.

Houdini showed his huge collection of books on magic and related arts to Sir Arthur, who was duly impressed but noticed the lack of "good books" on spiritualism, that is, books in favor of it. In a memorandum, Houdini noted later that day: "There is no doubt that both Sir Arthur and Lady Doyle believe absolutely in Spiritualism, and sincerely so. They related a number of incidents which they accepted without proof. They stopped for lunch and we enjoyed the visit very much. Lady Doyle passed a comment that this was the most home-like home that she had ever seen. After luncheon we called a car and took them to the Ambassador Hotel."

While in the car, Houdini showed Doyle a very childish trick, the apparent removal of the first joint of his thumb. The reaction of Doyle to this is quite exemplary of his naiveté: "Just a line to say how much we enjoyed our short visit yesterday. I think what interested me most was the little 'trick' which you showed us in the cab. You certainly have very wonderful powers, whether inborn or acquired."

The Fatal Séance

Doyle's lecture tour in the United States was hectic. He wrote to Houdini: "Until Thursday is over I shall be in turmoil. Then, when I can breathe, I hope to see you—your normal self, not in a tank or hanging by one toe from a skyscraper."

In early June, Houdini invited Doyle to attend the Society of American Magicians' annual banquet in New York: "You will meet some notable people and, incidentally, this is quite an affair to our organization, as some of the city officials and big business men will be there. . . . I know that you will be interested in witnessing the magicians' performance from a looker-on viewpoint."

To this, however, Doyle replied: "I fear that the bogus spiritual phenomena must prevent me from attending the banquet. . . . I look upon this subject as sacred." Houdini assured him "as a gentleman that there will be nothing performed or said which will offend anyone." Finally, Doyle agreed to participate: "Of course we will come. All thanks. But I feel towards faked phenomena as your father would have felt towards a faked Pentecost."

It was at this annual banquet of the Society of American Magicians that Doyle showed some of the film later to be incorporated in the picture adapted from his book *The Lost World* (see Summer 1995).

Later in the month, Doyle and his family took a well-deserved rest in Atlantic City, a wonderful chance to invite the Houdinis and spend some time together. "The children would teach you to swim!" wrote Sir Arthur to Houdini, "and the change would do you good." Houdini liked the idea and replied at once: "Mrs. Houdini joins me in thanking you for the invitation to come to Atlantic City, and if you will be there next Saturday or Sunday, Mrs. Houdini and I would like to spend the week-end with you. . . . Most important of all, if the kiddies want to teach me to swim I will be there, and in return will show them how to do one or two things that will make it very interesting."

The weekend was that of June 17–18, 1922, and the hotel at which the Houdinis and Doyles stayed was the Ambassador. On Saturday, they spent their time playing with the children in the hotel swimming pool. The next day, Sunday, Bess and Harry Houdini were sunning themselves on the beach when Doyle showed up. He had come to suggest that Lady Doyle should give Houdini a private sitting, at which she should endeavor to obtain for him a message from his beloved mother, through the instrumentality of her own mediumship, by means of automatic writing. However, he asked if Mrs. Houdini wouldn't mind waiting outside: "You understand, Mrs. Houdini, that this will be a test to see whether we can make any Spirit come through for Houdini, and conditions may prove better if no other force is present." This is how Houdini recalls what happened next:

> I walked with Sir Arthur to the Doyle's suite. Sir Arthur drew down the shades so as to exclude the bright light. We three, *Lady Doyle, Sir Arthur and I, sat around the table on which* were a number of pencils and a writing pad, placing our hands on the surface of the table.
>
> Sir Arthur started the séance with a devout prayer. I had made up my mind that I would be as religious as it was within my power to be and not at any time did I scoff at the ceremony. I excluded all earthly thoughts and gave my whole soul to the séance.
>
> I was *willing* to believe, even *wanted* to believe. It was weird to me and with a beating heart I waited, hoping that I might feel once more the presence of my beloved Mother. . . .
>
> Presently Lady Doyle was "seized by a Spirit." Her hands

Houdini performs the needle-threading trick. (Library of Congress Web site)

> shook and beat the table, her voice trembled and she called to the Spirits to give her a message. Sir Arthur tried to quiet her, asked her to restrain herself, but her hand thumped on the table, her whole body shook and at last, making a cross at the head of the page, started writing. And as she finished each page, Sir Arthur tore the sheet off and handed it to me. I sat serene through it all, hoping and wishing that I might feel my mother's presence.

The first sheet began: "Oh, my darling, thank God, thank God, at last I'm through. I've tried, oh so often—now I am happy. Why, of course, I want to talk to my boy—my own beloved boy—Friends, thank you, with all my heart for this." It continued on the same tone for fifteen pages. After the séance was over, Houdini asked about trying automatic writing at his own home, took a pencil, and wrote the name "Powell." Doyle was shocked, for a friend of his by that name, the editor of the *Financial Times* of London, had died about a week previously. For Doyle, it was further proof that Houdini himself was a medium: "Truly Saul is among the Prophets."

When Houdini and Doyle parted that evening, they had already formed two very different opinions of what had happened. According to Doyle, Houdini left "deeply moved" and, when they met two days later in New York, remarked to Sir Arthur: "I have been walking on air ever since."

Houdini's account, however, was much different. There were various details which could not be reconciled with what he knew about his mother. "Although my sainted mother had been in America for almost fifty years," he wrote, "she could not speak, read nor write English," and Lady Doyle's message was in perfect English. Also, her message began with the sign of a cross: the wife of a rabbi would hardly have communicated such a symbol. Furthermore, during the séance Houdini tried to think about familiar things that he had always discussed with his mother, and he expected some reference to them in the message. There was none, as there was no reference either to the fact that the day before the séance, June 17, was his mother's birthday.

Initially, Houdini did not reveal to Doyle all his doubts about the séance; however, he protested Doyle's casting him as a medium. Regarding the "Powell" incident, Houdini explained that he was referring to a magician friend, Frederick Eugene Powell, with whom at the time he was having a great deal of correspondence.

"No, the Powell explanation, won't do," was Sir Arthur's immediate reply. "Not only is he the man who would wish to get to me, but in the evening Mrs. M., the lady medium, got 'there is a man here; he wants to say that he is sorry he had to speak so abruptly this afternoon.' The message was then broken by your mother's renewed message, and so we got no name. But it confirms me in the belief that it was Powell. However, you will no doubt test your own powers further."

Before returning to England, Doyle received an invitation from Houdini: "Mrs. Houdini and I are going to celebrate our twenty-eighth marriage anniversary June 22nd. Would you care to join us in a little box party?" He did, so they went to see Raymond Hitchcock starring at the Carroll Theater in *Pinwheel*, "a hodge-podge of good-natured stuff." During the performance, Hitchcock called the attention of the audience to the presence of the two distinguished guests. Then, he asked Houdini to do a little stunt. Backed by Sir Arthur and by the whole audience yelling his name, Houdini reached the stage and performed the "Hindu needle trick," in which he appeared to swallow a quantity of needles, some thread, and then bring up the needles, threaded. "Seldom," wrote one reviewer the next day, "has there been heard such applause as that with which Houdini was greeted at the conclusion of the mystery. He finally made his way to his seat, but, with the audience speculating on the mystery, the *Pinwheel* performance was curtailed and the show swung into its closing number. Such an incident is unique, for . . . [there is] no mention, in the memory of the theatrical historian, of the feat of an artist not only stopping but curtailing a show in which he was not programmed to have a part."

Doyle finally left America with Houdini's telegram in his pocket: "Bon Voyage. May the Decree of Fate send you back here soon for another pleasant visit."

End of a Friendship

The decline of Houdini's and Doyle's friendship started when Houdini published an article in the *New York Sun*, in October 1922, in which he emphatically stated that he had "never seen or heard anything that could convince me that there is a possibility of communication with the loved ones who have gone beyond." To this, Sir Arthur, evidently hurt by Houdini's statement, which obviously implied that Lady Doyle's séance, too, had been a farce, replied: "I felt rather sore about it. You have all the right in the world to hold your own opinion, but when you say that you have had no evidence of survival, you say what I cannot reconcile with what I saw with my own eyes." He concluded: "I don't propose to discuss this subject any more with you, for I consider that you have had your proofs and that the responsibility of accepting or rejecting is with you."

Houdini, never one to shy away from a challenge, replied: "You write that you are very 'sore.' I trust that is not with me, because you, having been truthful and manly all your life, naturally must admire the same traits in other human beings." He then went on to explain all of his doubts concerning the séance and trusted Doyle would "not harbor any ill feeling." "I know," he stated, "you treat this as a religion, but personally I cannot do

so for, up to the present time, and with all my experiences, I have never seen or heard anything that could really convert me."

Their private quarrel soon became a public battle.

Early in 1923, Houdini had become a member of the *Scientific American* committee to investigate mediums, a fact that had left Doyle puzzled: ". . . you can't sit on an impartial Committee. . . . It becomes biased at once." Later he expressed his opinion publicly: "The Commission is, in my opinion, a farce, and has already killed itself. Can people not understand that 'psychic' means 'of the spirit,' and that it concerns not only the invisible spirit or the spirit of the medium, but equally those of every one of the Investigators?"

In April, Doyle returned to the States to continue his lecture tour and, in Denver, he met Houdini. They had long discussions about spiritualism and some recent psychic investigations. Doyle had witnessed a demonstration by "the Zancig," a couple of vaudeville mind-readers, and was convinced they were real telepaths. Houdini, however, knew them personally. They were acknowledged magicians and members of the Society of American Magicians, but nothing of this moved Doyle. "Sir Arthur said that he was capable of detecting trickery," wrote Houdini in his notes, "and we had a discussion in which I said that I did not think he could. He looked amazed at me, and I said, 'Why, every once in a while I see something I cannot account for.'"

While staying in Denver, the local newspaper interviewed Doyle. The reporter told him that Houdini was offering five thousand dollars for any medium's feat he could not duplicate, and Doyle said that he would give the same amount of money if Houdini could "show me my mother." Immediately, Doyle apologized to Houdini, saying he had been misquoted.

Next, it was Houdini's turn to be misquoted by a Los Angeles newspaper. After reading the interview, in which Houdini stated his views on spiritualism, Doyle wrote to him: "I have had to handle you a little roughly in the *Oakland Tribune*, because they send me a long screed under quotation marks, so it is surely accurate. It is so full of errors that I don't know where to begin. . . . I hate sparring with a friend in public, but what can I do when you say things which are not correct, and which I have to contradict or else they go by default?" In a subsequent letter, Doyle further explained: "I am very sorry this breach has come, as we have felt very friendly towards Mrs. Houdini and yourself, but 'friendly is as friendly does,' and this is not friendly, but on the contrary it is outrageous to make such statements with no atom of truth in them."

The breach was growing larger and larger. In another letter, Doyle remarked: "Our relations are certainly curious and are likely to become more so, for so long as you attack what I *know* from experience to be true, I have no alternative but to attack you in return. How long a private friendship can survive such an ordeal I do not know, but at least I did not create the situation."

The last letter that passed between them was written in February 1924 by Doyle. In reply to some request by Houdini for some kind of information, Sir Arthur wrote: "You probably want these extracts in order to twist them in some way against me or my cause." Some time later, Houdini sent a short note inquiring whether Doyle would like a copy of his new book, *A Magician Among the Spirits*, but got no answer.

Their friendship was over, but the quarrels would continue.

MARGERY GENUINE, SAYS CONAN DOYLE; HE SCORES HOUDINI

MEDIUM AND HER NEW CHAMPION

CRITICIZES THE EXPERT BODY IN SEVERE TERMS

All but Bird and Carrington Derelict in Silence Under Attack

HE ANALYZES ALL EVIDENCE ADDUCED

Surprised American Gentlemen Should Tolerate Wizard's Conduct

Boston Herald article, January 26, 1925. (Library of Congress Web site)

The Last Quarrel

In the summer of 1924, the biggest thing in psychical research was a new medium, powerful as well as attractive, whose name was "Margery" (Mina Crandon). She had entered the *Scientific American* competition and was considered to be the likeliest winner of the prize—at least until Houdini sat with her. In fact, he was immediately able to discern her true methods and promptly revealed them to the world.

Sir Arthur, who had met Margery and had endorsed her powers, considered Houdini's revelations trash and wrote a newspaper article to tell the story of the investigation, based on correspondence with Dr. Crandon, Margery's husband. The article was meant to discredit Houdini: "It should be the end of him as a Psychic Researcher," he wrote Crandon, "if he could ever have been called one."

When the article was published, Houdini announced that he would "contemplate legal action" against Sir Arthur for slander. "There is not a word of truth in his charges against me," he told a newspaper. "Sir Arthur has been sadly misinformed. Anyhow, I fail to see how he, being 3,500 miles away, qualifies as a judge." He attributed the sharpness of Doyle's attack to Doyle's being "a bit senile . . . and therefore easily bamboozled," and to a desire for revenge, since Houdini had

HOUDINI STIRRED BY ARTICLE, MAY SUE SIR ARTHUR

Noted Magician Is Angry at Creator of Sherlock Holmes for Published Attack.

NEW YORK, Jan. 27—Houdini, the magician, "contemplates legal action" against Sir Arthur Conan Doyle as a result of remarks about him contained in a copyrighted article by Dr. Doyle, published yesterday in the Boston Herald. Sir Arthur's article was an answer to Houdini's attack on the genuineness of Margery, the Boston medium, whom the committee of the Scientific American has been investigating.

Margery is Mrs. Le Roi G. Crandon, wife of a Boston physician, and Dr. Doyle introduced her to the public as a medium when he was here three years ago. He believes her alleged communications with her dead brother, Walter, are valid.

Houdini said yesterday he does not propose to let Sir Arthur get away with certain harsh remarks contained in the article. He will have a retraction, or "communicate with his lawyer." Also, Sir Arthur is a bit senile, says Houdini, and therefore easily bamboozled. Houdini has been investigating mediums for 35 years and he says he has never had a valid muni-

Springfield Union article, January 27, 1925. (Library of Congress Web site)

"often expressed the belief that Lady Doyle was not a valid medium." Doyle replied to Houdini's statements by diagnosing an "abnormal frame of mind" that he called "Houdinitis," one symptom of which was the belief "that manual dexterity bears some relation to brain capacity."

What had started as a beautiful friendship, nourished by mutual respect and admiration, ended in sharp words and threats of legal actions.

When Houdini died, on October 31, 1926, however, Doyle put the ill feelings aside and expressed fondness and shock: "I greatly admired him, and cannot understand how the end came for one so youthful. We were great friends. . . . We agreed upon everything excepting spiritualism." In a letter to Bess Houdini, Doyle wrote: "Any man who wins the love and respect of a good woman must himself be a fine and honest man," and went on to describe Houdini as "a loving husband, a good friend, a man full of sweet impulses."

Houdini . . . The "Medium"

"Who was the greatest medium-baiter of modern times? Undoubtedly Houdini. Who was the greatest medium of *modern times? There are some who would be inclined to give* the same answer."

This is the incipit of "The Riddle of Houdini," an essay by Doyle published in the July 1927 issue of *Strand Magazine* and included in his last book, *The Edge of the Unknown* (1930).

Doyle opened the essay by describing Houdini's merits:

> Let me say, in the first instance, that in a long life which has touched every side of humanity, Houdini is far and away the most curious and intriguing character whom I have ever encountered. I have met better men, and I have certainly met very many worse ones, but I have never met a man who had such strange contrasts in his nature, and whose actions and motives it was more difficult to foresee or to reconcile.

Doyle admired Houdini's "essential masculine quality of courage. . . . Nobody," he reckoned, "has ever done, and nobody in all human probability will ever do, such reckless feats of daring." He also praised Houdini's "cheery urbanity" in everyday life: "One could not wish a better companion so long as one was with him, though he might do and say the most unexpected things when one was absent."

Aside from these and other virtues, Doyle noted that "a prevailing feature of his character was a vanity which was so obvious and childish that it became more amusing than offensive. . . . This enormous vanity was combined with a passion for publicity which knew no bounds, and which must at all costs be gratified."

The main feature of the essay, however, was the exposition of Doyle's theory according to which Houdini was a real medium. He claimed that no tricks could explain Houdini's feats, such as his escapes from jails: "It takes some credulity, I think, to say that this was, in the ordinary sense of the word, a trick."

"I contend," stated Doyle, "that Houdini's performance was on an utterly different plane, and that it is an outrage against common sense to think otherwise." According to Doyle, then, Houdini possessed strong psychic powers that enabled him to dematerialize from his confinement and then rematerialize outside of it.

The fact that Houdini had always told Doyle that he had no psychic power whatsoever and that he used only trickery, a fact that Bess Houdini had repeated to Doyle after her husband's death, did nothing to convince Doyle. Instead, these denials further induced him to believe his theory was correct:

> Is it not perfectly evident that if he did not deny them his occupation would have been gone for ever? What would his brother-magicians have to say to a man who admitted that half his tricks were done by what they would regard as illicit powers? It would be "exit Houdini."

This was one of Doyle's last works. In one of his last letters, to Houdini's lawyer, B. M. L. Ernst, Sir Arthur wrote: "I write this in bed, as I have broken down badly, and have developed Angina Pectoris. So there is just a chance that I may talk it all over with Houdini himself before long." On July 7, 1930, four years after the death of the arch-skeptic Houdini, Sir Arthur Conan Doyle, the extreme believer, died.

Note

1. All the correspondence excerpts between Houdini and Doyle quoted in this article come from the book *Houdini and Conan Doyle*, by B. M. L. Ernst and H. Carrington (1932).

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Spontaneous Human Combustion

Thoughts of a Forensic Biologist

Paranormal proponents and popular articles are quick to attribute certain dramatic fire-death characteristics to an unknown or bizarre power source, but in all such deaths documented in forensic literature, there has been no need to resort to bizarre interpretations to account for the observed facts.

MARK BENECKE

Forensic scientists very rarely, if ever, mention the (alleged) phenomenon of spontaneous human combustion (SHC). After reading an article on the subject in *BILD*, Germany's most famous tabloid newspaper (circulation four million daily), I started to wonder about this.

I first contacted the chief of our local police department, who is responsible for fire accidents, arson, and other fire-related incidents. After a few minutes of conversation, he recalled having heard about cases of spontaneous combustion, although he had never been an eyewitness to any such cases. He later sent me an article (Feuer unbekannten Ursprungs c. 1990), which was a collection of case reports of alleged spontaneous combustion cases. The cases had received worldwide coverage in newspapers and magazines, and the article seems to be one of the major sources of information for Germans interested in the phenomenon. Further

research led me to several accounts of SHC in the popular press (e.g., an account by a physicist in a German rock magazine [Czerny 1996]), novels (e.g., Charles Dickens's novel *Bleak House*, thought to have been inspired by the death of countess Cornelia Bandi in 1731), early reports (Hünefeld 1830), and magazines such as the *Fortean Times* (e.g., Simmons 1996; Arnold 1996) and *The X Factor* (e.g., Burning question 1996). From such sources, it is obvious that a significant percentage of the public believes in SHC.

The Expert Sources

To my knowledge, no scientific book or article written by a chemist, physicist, biologist, or doctor has ever reported bodies suddenly igniting through some internal but unknown mechanism. The two alleged expert eyewitnesses cited in the collection of case reports—"Dr. B. H. Hartwell" and "a certain Dr. David Price"—have never been found. Nevertheless, for the forensic biologist it is worth thinking about the possible evidence that may be found in photographs taken at scenes of alleged SHC. For this reason, I will focus on the evidence that may be gained from a detailed examination of photographs of unusual death by burning found in the forensic and medical literature, and that have been cited as proof of SHC by proponents of the phenomenon.

In many forensic cases that could be claimed to be SHC, we have as resources (1) the photographer, (2) the pathologist, forensic doctor, or medical examiner consulted, and (3) the police report for the case. I will restrict my observations to the facts as given by these expert sources because the speculations on causes of alleged SHC in popular articles are, in my opinion, nonscientific. Such speculations include: ignition of cellular oxygen and hydrogen (Heymer 1996), "Pyroton particles" (Arnold 1995), and maser (microwave amplification by stimulated emission of radiation) induction (Czerny 1996). Other nonscientific theories involve geomagnetism, kundalini (a form of mystic body heating), and electrostatics. Even the *Fortean Times* has been critical of two recent books on SHC: "He [Heymer 1996] seems to be under the illusion that [hydrogen and oxygen] exist as gases in the cell and are thus vulnerable to ignition, which is, in fact, not the case. Arnold proposes a new subatomic particle, the Pyroton, which interacts with cells and causes catastrophic combustion. There is, however, no independent evidence for such a particle and just inventing it to explain SHC is not really a runner" (Simmons 1996; see also Nickell 1996). As for masers, no such portable device capable of producing SHC exists, and it is unlikely such an apparatus will be constructed in the near future.

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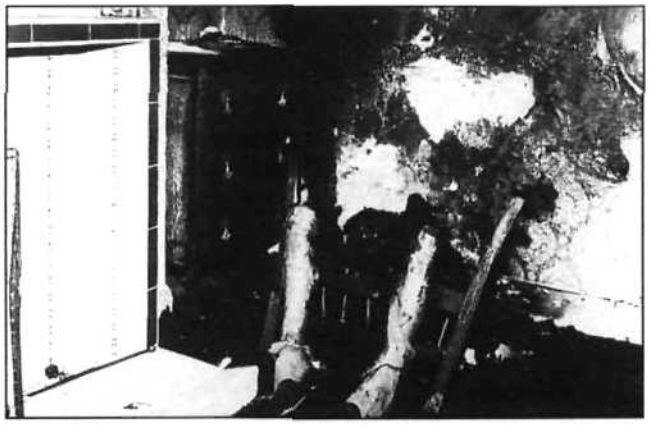

Figure 1: Corpse of a woman with Parkinson's disease who accidentally caught fire by a burning cigarette. From Gresham 1977, p. 181.

Figure 2: Corpse of a woman who fell into a fireplace after a heart attack. From Gresham 1977, p. 183.

Characteristics of Burned Corpses

In popular articles, the characteristic sign of SHC is said to be the complete combustion of a body with the exception of the extremities—legs, hands, or head—with only an ashlike substance left in the thoracic and abdominal areas. At the same time, little or no destruction of the surroundings (beds, chairs, and so on) is observed. Frequently, however, a brown oily residue is deposited on the furniture and walls. These signs are present in Figures 1 and 2. The exact date of death is not given in the book from which the photographs are taken, but each is the original photograph taken at the scene of death.

Proponents of SHC attribute such unusual scenes to an unknown or bizarre power source, but in all such deaths documented in forensic literature, there has been no need to resort to bizarre explanations to account for the observed facts. It was determined for the case shown in Figure 1 that an elderly woman, suffering severely from Parkinson's disease, could not control her hand movements while smoking and dropped her

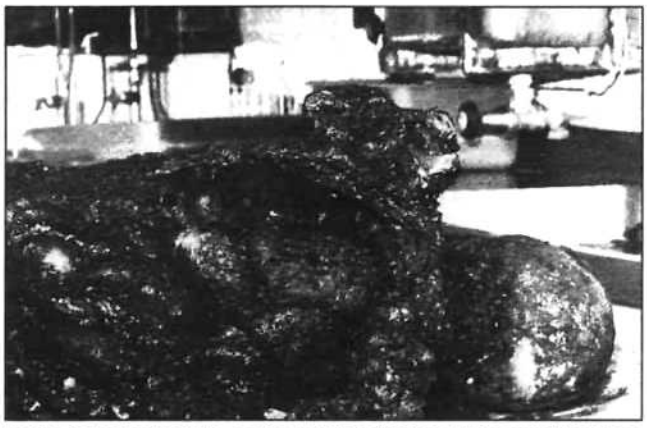

Figure 3: Top part of the corpse shown in Figure 1. Lungs and heart are visible from the back, which was burned away together with the back parts of the ribs and spinal column. Maximum heat developed on the woman's back. From Gresham 1977, p. 185.

glowing cigarette. Additional matches and cigarettes were found on the floor next to the woman's remains (Gresham 1977). For Figure 2, investigators determined that an elderly woman fell into a fireplace after having a heart attack (Gresham 1977). In both cases, a thorough criminal investigation was carried out by experienced staff.

The main objection that supporters of SHC have to such ordinary explanations is that they doubt that the course of an event can be demonstrated in retrospect, especially in cases of burning. This is not true. Forensic examination of charred remains will reveal many clues. Forensic scientists, medical examiners, pathologists, and police experts are able to deduce a great deal of information from very severely burnt bodies, even from ashes and the remains left after cremation (e.g., Marples and Browning 1994; Merkel 1932).

Consider, for example, Figures 1 and 3. Figure 3 displays the top part of the body shown in Figure 1. (Paramedics had removed this part of the body *before* the photographs were taken [Gresham 1977] which explains why the torso is missing in Figure 1.) The organs, as seen in Figure 3, are still clearly visible. This is the typical appearance of a person who died by burning. The medical examiner and the forensic pathologist were able to conclude from the autopsy that the woman's hair first started to burn, the fire then spread to her back, followed by the rest of the upper part of her body (Gresham 1977). Presumably she wore clothing and the fire spread along the material (Pescod 1996).

Because of the good condition of the organs, it is possible (in most cases) to determine with great accuracy the cause of death, especially in cases involving poisoning, strangulation, heart attack, and brain damage.

In contrast to the first impression conveyed of gross destruction of the whole body, internal organs are frequently not essentially changed. If they are, it is in a known, reproducible manner. Even intestines, stomach, liver, heart, uterus, bladder, etc., are often well preserved (see Figure 4). The high temperature of the outer parts of the burning body is not maintained internally, where fluids in the various organs and cavities help prevent their incineration. (For an overview on the temperature gradient, see Masuth 1978.) This effect is not commonly known, and even first-year medical students express surprise when shown burned corpses containing intact organs.

The temperature gradient is the reason some body parts, such as legs, do not burn, while neighboring parts do. Pictures of "just legs" can be explained by the rapidly decreasing temperature from the top of a sitting person to the bottom. (Or sometimes the upper body parts have simply been removed before the picture was taken, as in the case cited earlier, Figures 1 and 3.) Even a match will often stop burning if it is held with the flame pointing upward.

Figure 4: A severely burned corpse. Note that the heart and intestines are well preserved. From Prokop and Radam 1987, p. 192.

Another theory, the *multiple wick effect theory*, predicts that only body parts covered by clothing will burn, whereas body parts not covered by clothing will remain intact (Pescod 1996). Items of clothing act as multiple wicks and support burning over a long time because the body fat in subcutaneous layers changes into a liquid form. O. Prokop, Germany's major authority in forensic medicine for more than thirty years, wrote: "The liquefied [body] fat of the subcutaneous layer can soak into the clothing, causing it to act like a wick which maintains the fire. Only this mechanism can explain the most severe combustions which are observed in persons who, for example, fall asleep whilst smoking" (Prokop 1960). Ignition, in that case, always starts with the clothing (Masuth 1978). Furthermore, 40 percent of all seventy-five people who died by fire in closed rooms between 1964 and 1973 in Cologne had a blood alcohol level of more than one part per thousand (Masuth 1978), and 54 percent of all eighty-seven fire victims who died in Oslo had a blood alcohol level of more than one part per thousand (Teige 1977). These observations support that many people who die in fire accidents are under the influence of alcohol, which explains why (1) people fall asleep while smoking and (2) why they do not wake up immediately after the fire starts. Furthermore, elderly people often cannot move fast enough to extinguish the fire, as in the case of the woman with Parkinson's disease discussed above (Figure 1).

Another example of an elderly person's not taking action soon enough is the case of a seventy-year-old woman who was found standing, dead, "lifeless and rigid," with burning clothes, in a doorway between two rooms (Figure 5, Bschor 1965). Found next to her was a newspaper, folded lengthwise to light an oven fire, and partially burned at the top. The oven

Figure 5: Seventy-year-old woman standing dead rigid in a doorway after her clothes burned. Redrawn by Benecke, after Bschor 1965, p. 33.

was filled with wood that was not kindled.

Effect of Heat on Human Bodies

Articles arguing for SHC often state that local temperatures in excess of 1,500°C are necessary to produce the "typical picture" of alleged SHC. Again, this is not true. Burkhard Madea, a German forensic scientist, collected much of the information available in this field. He states (Madea 1992) that corpses of children (age not given) can be completely destroyed at 500°C in two hours (except for small pieces of calcined bone), and that corpses of adults, as a rule, burn down to less than 1 kg (other sources say 2.25 kg) of a crumbly substance at 800–1,000°C within one hour. Richards (1977) reports his observations on corpses of adults cremated at around 680°C: the arms are heavily charred after 10 minutes; the legs are heavily charred after 14 minutes; and the skull and bones of the upper arm are visible after 15 minutes. If no external source of fire is present, the layer of fat under the skin is known to promote burning (Gresham 1977; Evans 1963). (The average amount of fat in an adult body equals 15.4 kg [Evans 1963]). The body will in fact reach temperatures of around 500–600°C (dark red glow), especially if a person is wearing highly flammable clothing or, as is more frequently the case, if another person intensifies the fire by pouring flammable liquids over the corpse to make the death look like an accident (Eckert et al. 1988).

The presence of alcohol in the body is commonly thought to be responsible for rapid and intense combustion (e.g., Feuer unbekannten Ursprungs c. 1990). This is a misunderstanding. The concentration of alcohol in a body would be much too low (try to ignite beer with a conventional flame). Diluted alcohol will neither burn nor spontaneously explode. Oxygen has to be present to allow ignition and combustion. For example, at room temperature the only way to make gasoline explode with a conventional flame is to let it vaporize in a closed container and then set the gas on fire. In a human body, an explosion, or perhaps even fast burning due to flammable liquids, is impossible. In 1850, the chemist Justus von Liebig showed that even tissue soaked with diluted alcohol would not burn to ashes, not even with the application of an external flame.

In forensic practice, there are no known cases in which internal organs of a burned corpse were damaged more severely than the outer parts (see Figure 6). This practical observation is further proof that combustion never starts from *inside* a human body.

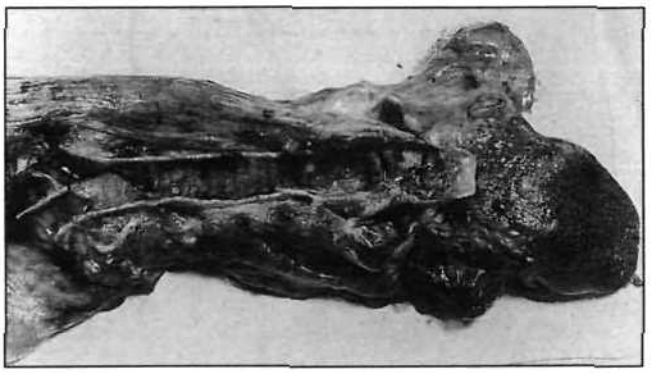

Figure 6: Here, tongue and trachea of a victim are visible (picture taken after dissection). Soot inside the trachea indicates that the person was living during the fire and inhaled sooty air. From Prokop and Radam 1987, p. 185.

Concluding Remarks

Many photographs of alleged SHC appear to have fooled observers by not showing the complete remains of the bodies as found *in situ* (again, as with Figures 1 and 3). However, there are cases in which human bodies are reported to have burned fiercely. This is confirmed by routine forensic and police procedure (e.g., Madea 1992) and does not require further explanation. Sometimes inconspicuous initial fire sources, like cigarettes, together with relatively low burning temperatures developing subsequently, and the presence of subcutaneous body fat, can be sufficient to reduce a body by burning. In many cases, one also has to consider the role of individuals who may wish to cover up evidence of a crime.

The pictures and reports published on SHC up to now can be explained by well-known and understood mechanisms that are regularly found at the sites of burning. There is no need to invent bizarre chemical reactions or paranormal activities to explain what is mistakenly called "spontaneous combustion."

Acknowledgments

I most sincerely thank David Taylor-Pescod, who made valuable comments on the manuscript and who informed me of the theory of the multiple wick effect. Klaus Fehling drew my attention to the subject of SHC. Superintendent Dahmen from the Cologne criminal investigation department, Sibylle Banaschak from Münster University, and Michael Bohnert from Freiburg University gave me additional help.

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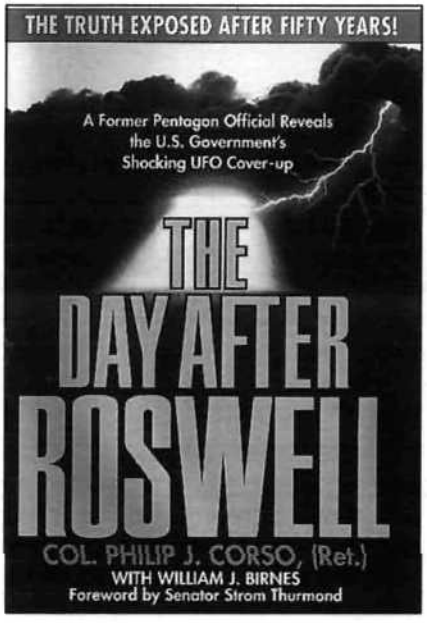
Philip Corso's Roswellmania

BRAD SPARKS

The Day After Roswell. By Col. Philip J. Corso (Ret.) with William J. Birnes.
Pocket Books/Simon & Schuster. 1997. ISBN 0-671-00461-1. 341 pp. Hardcover, $24.

The only thing extraterrestrial in Philip Corso's book *The Day After Roswell* is the height of his tall tales, certainly the tallest Roswell tales to date. For those of you blessed with not having heard it before, his thesis is that many of our high-tech advances such as the transistor, microcircuits, lasers, fiber optics, microwave ovens, Star Wars SDI weapons, and so on, all actually came from "reverse engineering" the alien technology purportedly found in the UFO that crashed near Roswell, New Mexico, in July 1947—a feat largely made possible by Corso himself when he allegedly divvied up the alien goodies while working at Army R&D in the early 1960s. But in his haste to cash in on the fiftieth-anniversary Roswellmania, he has made some fantastic blunders of history that expose him in the most embarrassing way. These are not mere errors or innaccuracies, as his coauthor William Birnes claims (Microsoft Network online chat interview, December 9, 1997; http://forums.msn.com/UFO). They are *impossibilities.*

Corso cannot resist putting himself


THE TRUTH EXPOSED AFTER FIFTY YEARS!
A Former Pentagon Official Reveals the U.S. Government's Shocking UFO Cover-up
THE DAY AFTER ROSWELL
COL. PHILIP J. CORSO, (Ret.)
WITH WILLIAM J. BIRNES
Foreword by Senator Strom Thurmond

at the center stage of great events of history, courted by big names such as Robert Kennedy and his "old friend" J. Edgar Hoover (pp. 2, 37, 84, 156, 191, 206–209, 255; page references throughout are to the edition of Corso's book minus the now withdrawn foreword by Sen. Strom Thurmond). In fact, Corso's "other book" is called *I Walked with Giants.*

Corso is ever the powerful hero, but he trips on his way up the stairs to the stage. Corso has apparently made a cynical calculation that he will be able to make his bundle and retreat before anyone can develop a sufficient publicity base to expose him, so he saw no need to research his lines to get them perfect. The only thing he has carefully avoided is getting trapped into endorsing a particular Roswell crash site or time line from the multitude now being promoted. He cannot clarify the confusion for us because he claims not to remember too clearly the elementary details of the date and location of what he claims is the single most important event in human history (pp. 5ff)—to say nothing of his military career—even though he states he had two years to pore over the top-secret Roswell files while at Army R&D headquarters. Instead, all he really knows is what happened the "day after" Roswell, starting from when the alien material was transported, hence the title of the book (p. 55). How convenient.

Corso tells how he personally intimidated the CIA director of covert operations to stop having CIA agents follow him around. This is part of Corso's story of how he got the job of exploiting alien technology as head of the Foreign Technology desk of Army R&D in "early 1961" (pp. 50, 63–64, 177). The alien microchips and other technology had been recovered from Roswell decades earlier but gathered dust in one filing cabinet, together with extensive files and documents on the case, until Corso came along and figured out what to do with them. A "couple of days" before he was officially expected to begin at the Pentagon (p. 37), he was led through backdoor means to meet his new boss

Brad Sparks is an aerospace researcher and writer with thirty years' experience in UFO investigations and an increasingly skeptical outlook. A more detailed version of this review is to be published in the International UFO Reporter. *A new study of the original Kenneth Arnold "flying saucer" of 1947 is in progress.*

and old friend, Lt. Gen. Arthur Trudeau, head of Army R&D. (His military records indicate he arrived at Army R&D Headquarters in the Pentagon from Baltimore on May 5, 1961.) This was supposedly done so that no one would know officially that Corso was inside the Pentagon yet and so he would not be followed. Corso asked why he couldn't go through the "front door." Trudeau allegedly replied, "Because they're already watching you, Phil." Thus Corso learned he was being tailed by CIA personnel (pp. 37, 44, 87, 107, 174, 185), but he was determined to not play along.

Corso claims he marched right past a startled secretary and into the office of the CIA director of covert operations, Frank "Wiesner" (it's "Wisner"), at CIA headquarters in "Langley, Virginia" (also wrong, but more on this later) and told him off (p. 87). This must have been shortly after the initial meeting with Gen. Trudeau, in early May 1961. Corso claims he warned "Wiesner" that he would start carrying a gun and if he ever found a CIA man following him again, the agent would be found with bullet holes in his head. Later in 1961, claims Corso (p. 87), "Wiesner" himself was found dead by hanging in a London hotel room, the victim of suicide.

The problem is that Frank G. Wisner had been hospitalized and replaced as top CIA covert operator nearly three years earlier, in August 1958, first by acting covert operations director Richard M. Helms and then by Wisner's permanent replacement, Richard M. Bissell, on January 1, 1959. Thus Bissell was the actual CIA Chief of the Clandestine Service (or Deputy Director for Plans) serving in 1961, not Wisner.

Bissell is famous in history as the leader of the U-2 and the Corona spy satellite projects at the CIA, as well as the architect of the disastrous Bay of Pigs invasion that had dominated the headlines for the few weeks before Corso arrived at the Pentagon in 1961. So it is surprising that the supposed intelligence expert Corso has such a poor grasp of intelligence history as to not know these well-known facts. Bissell's name was repeatedly cited as the chief planner of the Bays of Pigs operation in front-page news stories at the time (*New York Times*, April 21, May 3, 1961; also July 17, 1961, p. 13). Corso also should have known who Bissell was since he claims that he took over the Corona spy satellite program in 1961 (pp. 131, 136)—and that was Bissell's project. I interviewed Bissell almost twenty years ago about his UFO involvement and Project Corona, and naturally he never mentioned Corso or Roswell.

Worse still, Wisner was not even in the United States in 1961 but was in London. Wisner had been sent overseas to take the less demanding post of CIA Chief of Station in London on August 6, 1959, but was recalled from London in the spring of 1962 and resigned from the CIA entirely in August 1962. So Corso could not have driven to Wisner's office in 1961 and barged in, let alone slipped through CIA Security so easily to threaten the top spook in the Agency.

Furthermore, the new CIA headquarters in Langley, Virginia, was not yet open for business in May 1961, when Corso's confrontation with the top CIA spook supposedly took place there. The new building did not receive its first CIA employees until September 1961. (See *New York Times*, May 3, May 21 [*New York Times Magazine*], Sept. 28, Oct. 8, Nov. 6, 1961.)

Worst of all, Frank Wisner did not "hang himself" in a "London hotel" in 1961. He killed himself with a shotgun on his family farm in Galena, Maryland, on October 29, 1965—years after Corso claims the suicide occurred, and on the wrong side of the Atlantic. There's no need to add to the Wisner family's tragedy with preposterous stories linking him to extraterrestrial investigations, distorting the sad details of his demise, and even falsely accusing him of being "one of the best friends" the Soviets ever had (p. 87). Wisner had been depressed since the Hungarian Revolution of 1956, which he helped inspire as the top CIA clandestine official, only to see it brutally suppressed. Wisner never recovered from his personal anguish over the tragedy.

Coauthor Birnes defends the story Corso told him about Wisner, but the impossibilities remain unexplained.

Corso again imaginatively inserts himself into history by alleging that, as the Army Foreign Technology czar in charge of Roswell, he helped President Kennedy decide to send a man to the moon. Corso alleges that he worked on a moon-base plan called Project Horizon to help keep the ETs at bay, a plan he urged on Attorney General Robert Kennedy in a personal meeting in May 1962 (pp. 2, 37, 156, 191, 206, 255). Soon after this meeting, says Corso, JFK announced the Apollo program goal to land a man on the moon by the end of the decade, and Corso claims credit (p. 156). There is no proof of any of this, so he pads his book with fifty-plus pages of irrelevant Project Horizon technical documentation, none of which mentions ETs or UFOs or Roswell (pp. 275–332).

The only difficulty is that JFK made the famous Apollo project announcement on May 25, 1961, *a year earlier* than Corso's story indicates. He is tightly locked into his 1962 date for his involvement in inspiring JFK's Apollo plan (pp. 155, 255), and there is no way out.

Birnes defends the 1962 date, saying the meeting was "more concerned with the CIA, and the KGB's penetration of it, than the space race." If so, then Corso must retract his impossible claim of helping JFK's 1961 Apollo decision in 1962, as that would require time travel.

Corso states in one place that only "five to six of us" in all three military services were privy to the Roswell secrets in the 1960s (p. 85). Yet he tells how the Roswell "package" spread out further and further among the services over the years following 1947 with little or no coordination until he came along (pp. 51–62, 71, 73, 78, 82–84). Plus he says that several military members of the committee in control of the Roswell coverup (pp. 62, 69, 71, 74, 82) had spies stationed at the Pentagon (p. 175); that a number of

military pathologists at Walter Reed, Bethesda, and Roswell air base performed autopsies on the alien bodies (pp. 91–92, 96–99, 190); that "military intelligence personnel" developed cattle mutilation surgical methods (p. 181); that many military technicians were involved in test flights of the Roswell craft at Norton, Edwards, and Nellis AFBs (pp. 99–100, 107, 218); and that military personnel served as administrators of an Air Force–CIA "alien technology museum, the final resting place of the Roswell spacecraft" (p. 100). In fact, Corso admits there were a "large number of people who really know the truth" about Roswell by 1961–1963 such as "top-ranking military officers" (p. 100). Corso wants to be the hero in charge of rescuing a huge project involving many people and agencies sharing the Roswell secret. But this contradicts the notion that he was one of a privileged elite, just five or six after fifteen years. If that few were in charge of the Roswell craft after so long, how many were there at the start, zero? Maybe that is the real truth; it started with zero because it never happened.

Birnes's response to this contradiction is to confuse the dates and quibble over whether the pathologists involved were actually in the military (they were military officers).

Another alleged Corso achievement already mentioned is his purported takeover of Project Corona, the pioneer U.S. spy satellite program. Corso has done a poor job of reading up on space history, since he could not have actually worked on the real classified Corona program and gotten things so wrong. He does not even know that Corona was CIA! He imagines a ludicrous plot in which one agency has to hide spy satellite payloads aboard another agency's satellites, all necessitated by NASA's supposedly assuming control of "all satellite launchings," including the military's, from 1958 until the 1970s (pp. 126, 128–129, 138, 144–147, 155–157). But NASA never had control of military launchings. The existence of an Air Force launch pad completely separate from NASA's Cape Canaveral should settle it. Who does he think has launched satellites from Vandenberg *Air Force* Base in California from 1959 to the present day? Santa Claus and his elves?

Corso is also the hero of the Cuban missile crisis (pp. 253–258, 269), Reagan's Strategic Defense Initiative (pp. 4–5, 78, 115, 243, 249–250, 268, 273), the Korean War POW revelations (pp. 2, 37–38, 87), the exposure of KGB moles inside the CIA and elsewhere (pp. 2, 37, 139, 141, 189), and the JFK assassination (pp. 2, 87, 206, 208), which he intimates was due to JFK's finding out the truth about the CIA. Corso plans a new book, *The Day After Dallas*.

And, of course, Corso is the hero of Earth's desperate but successful "war" against the ETs (or *EBEs*, Extraterrestrial Biological Entities, a term he borrowed from the fraudulent MJ-12 documents) (pp. 5, 142, 249–250, 260, 269). According to Corso, we had negotiated a "surrender" treaty with the aliens until we were able to reverse-engineer enough Roswell weapons to fight back (pp. 268ff). Incidentally, this war against UFOs led to the meeting between Reagan and Gorbachev that ended the Cold War (pp. 262–263, 266, 268).

As Corso modestly boasts, "Sometimes, once in a very long while, you get the chance to save your country, your planet, and even your species at the same time" (p. 273). Corso gives whole new meaning to the term *delusions of grandeur*.

Corso's notion that many of our high-tech innovations were really back-engineered from extraterrestrials is a new twist on the Ancient Astronauts theory. Instead of saying humans were too stupid to invent pyramids or the wheel on their own and had to get the ideas from space visitors, Corso has updated the concept, saying we got the microwave oven (p. 178) and laptop computers (pp. 170–173) from aliens.

Having established the impossible nature of Corso's stories involving himself inside CIA headquarters and the Justice Department, I see no need to go into the rest of his claims about his heroic role in getting U.S. industry to reverse-engineer microchips and lasers from his make-believe Roswell spacecraft. The dramatic stories that are easiest to check against historical fact are enough proof of the lack of credibility of Corso's whole thesis.

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NEW BOOKS

Listing here does not preclude future review:

But Is It Science? **Edited by Michael Ruse.** Prometheus Books, 59 John Glenn Dr., Amherst, NY 14228-2197. 1996. ISBN 1-57392-087-8. 406 pp. Softcover, $22.95. Trade paperback edition of valuable anthology on the creation/evolution controversy. Ruse, a philosopher, focuses the book on a theme he finds fascinating and important: What precisely is the status of the various knowledge claims that are being forwarded, supported, and criticized in the debate? Divided into four sections: The Nineteenth Century Background, Evolution Today, The Creationist Challenge, and The Philosophical Aftermath. Authors include Ruse, Francisco Ayala, Karl Popper, Stephen Jay Gould, John Maynard Smith, Richard Dawkins, Ronald Numbers, Duane Gish, Larry Laudan, and Philip Quine. Also includes excerpts from Charles Darwin and T. H. Huxley, plus Judge William R. Overton's eloquent opinion in *McLean v. Arkansas*, the 1981 case in which the federal district judge overturned an Arkansas law requiring "balanced" classroom treatment for evolution and "creation science."

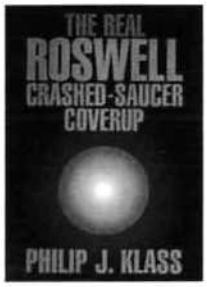
The Loch Ness Monster. **Steuart Campbell.** Prometheus Books, Amherst, NY. 1997. ISBN 1-57392-178-5. 128 pp. Softcover, $14.95. A revised, U.S. edition of a book originally published in the U.K. in 1991. Campbell critically examines the facts and fictions regarding the supposed Loch Ness creature. He carefully deals with evidence and claims from, in order, eyewitnesses,

above-water still and film imagery, underwater photos, and sonar and radar.

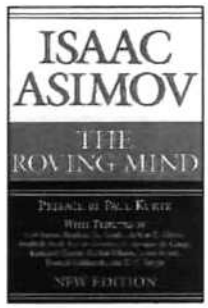
Net Wars. **Wendy M. Grossman.** New York University Press, 70 Washington Square South, New York, NY 10012-1091. 1997. ISBN 0-8147-331103-1. 236 pp. Hardcover, $21.95. A journalist's lively assessment of the battles that will define the future of the Internet. Among the many topics covered are the Church of Scientology raids on Net users.

The Psychic Mafia. **M. Lamar Keene.** Prometheus Books, Amherst, NY. 1997. ISBN 1-57392-161-0. 177 pp. Softcover, $16.95. A welcome republication of this long-out-of-print confessional. Keene, the "Prince of Spiritualists," became famous and rich as a medium/clairvoyant who could produce objects out of thin air and conduct séances at which participants could seemingly talk and even touch the dead. But it was all a fraud—a trick played on willing, gullible victims. Keene here exposes the secrets of the séance room. With a foreword by Ray Hyman about "self-sealing belief systems" and a caution that everyone is vulnerable. *All* of us can be deceived, given the right circumstances.

The Real Roswell Crashed-Saucer Coverup. Philip J. Klass. Prometheus Books, Amherst, NY. 1997. ISBN 1-57392-164-5. 225 pp. Hardcover, $24.95. Philip Klass, the veteran aerospace journalist and dean of skeptical UFO investigators, here documents that without a doubt there has been a massive coverup of the truth regarding the so-called Roswell crashed flying saucer. But, as he persuasively shows, the coverup is not by the government but by the authors of books and articles and TV show producers who have made false accusations of the government while themselves withholding information from their readers and viewers. The information consists of hard, credible evidence that no extraterrestrial craft crashed in New Mexico in 1947. In twenty-nine chapters of clear analysis and assessment with such titles as "Schmitt Spins Tall Tales," "Contaminated Memories," "The Nurse Who Never Was," "Kent Jeffrey Shouts the Truth," and "TV's Role in the REAL Roswell Coverup," Klass puts what should be the final kibosh on the Roswell tale. This book is must reading for everyone who has any interest in this controversy and for all reporters and everyone in the communications and entertainment industries who publishes or broadcasts anything about UFOs.



The Roving Mind. **Isaac Asimov.** Prometheus Books, Amherst, NY. 1997. ISBN 1-57392-181-5. 350 pp. Softcover, $18.95. A welcome new edition of a book, dedicated to CSICOP, of sixty-two essays by the late polymath and defender of science and reason. Asimov allows his imagination to roam freely, demonstrating his inquisitive and creative mind. Newly added are a preface by Paul Kurtz and the tributes to Asimov titled "A Celebration of Isaac Asimov: A Man for the Universe" by noted friends, scholars, and writers, published in the Fall 1992 SKEPTICAL INQUIRER shortly after Asimov's death. Asimov arranged his essays into seven sections: The Religious Radicals; Other Aberrations; Population; Science: Opinion; Science: Explanation; The Future; and Personal.



Science, Reason and Anthropology. **James Lett.** Rowman & Littlefield Publishers, Inc., 4720 Boston Way, Lanham, MD 20706. 1997. ISBN 0-8476-8592-6. 160 pp. Hardcover, $55. ISBN 0-8476-8593-4. 160 pp. Softcover, $16.95. An exploration of the philosophical foundations of anthropology and the fundamental principles of rational inquiry upon which sound anthropological knowledge is based. A field guide to critical thinking and an analysis of the nature of reason, the book also attempts to correct for what the authors sees as a threat to anthropology's intellectual integrity from those within its ranks who advocate irrational approaches to knowledge.

—Kendrick Frazier

ARTICLES OF NOTE

Blackmore, Susan J. "Probability Misjudgment and Belief in the Paranormal: A Newspaper Survey." *British Journal of Psychology*, 88: 683–689, 1997. Report on a survey of paranormal beliefs of 6,238 readers of a British newspaper. See News and Comment, this issue.

Buckley, Christopher. "Kooks Around the Corner." *Washington Monthly*, November 1997, pp. 42–44. Why we can't get enough of conspiracy theories, and what our obsession is costing us.

Frantz, Douglas. "Death of a Scientologist Heightens Suspicions in a Florida Town." *New York Times*, December 1, 1997, pp. A1, A16. Lengthy report on the case of Lisa McPherson, a Scientologist who had appeared healthy and successful but slipped into dementia and died inside the Church of Scientology's flagship building in Clearwater, Florida. The reporter says the case has rekindled deep suspicions in Clearwater, "the unlikely spiritual headquarters of one of the world's most-debated churches."

"Furor on the Left Bank." *World Press Review*, January 1998, pp. 17–19. Reprints of three short pieces on the intense controversy in France over the book by physicists Alan Sokal and Jean Bricmont, *Les Impostures Intellectuelles*, exposing the meaninglessness of much of the language of France's postmodern structuralist philosophers. Includes "Philosophical Phonies" from *The Guardian*, an interview with Sokal, and a response from Julia Kristeva, one of the thinkers singled out in the book's attack.

Gardner, Martin. "Mathematical Realism and Its Discontents." *Los Angeles Times Book Review*, October 12, 1997, pp. 8–9. Essay review of Reuben Hersh's *What Is Mathematics, Really?* and Stanislas Dehaiene's *The Number Sense* strongly criticizes the books' contentions that mathematical objects and theorems have no reality apart from human minds and that no proof in mathematics is absolutely certain. This review caused quite a debate among mathematicians, and Hersh responded in detail in an Internet document.

Gould, Stephen Jay. "The Paradox of the Visibly Irrelevant." *Natural History*, December 1997/January 1998, pp. 12–18, 60–66. Fascinating article on the urban legend that evolutionary processes occur far too slowly to yield any observable result in a human lifetime. Gould calls this an "utterly false impression." He reports on four specific, recently reported instances among "a

veritable glut of cases for rapid and imminently measurable evolution on timescales of years and decades."

Gross, Paul R. "Science Without Scientists." *New York Times*, December 1, 1997. Op-ed column criticizing the state of California's decision to reject an offer from three Nobel laureates in chemistry (Glenn Seaborg, Dudley Hershback, and Henry Taube) who volunteered for free to help write new standards for teaching science in public schools. Instead, the state issued a $178,000 contract to a group of professional educators at California State College at San Bernadino.

Lieberman, Adam J. "Facts Versus Fears: A Review of the 20 Greatest Unfounded Health Scares of Recent Times." *American Council on Science and Health*, September 1997. ACSH is dedicated to separating real, proven health risks from unfounded health scares based on questionable, hypothetical, or even nonexistent scientific evidence. This report summarizes what ACSH says are 20 of the most noteworthy scares of the past half century. Among them: The "Cranberry Scare" of 1959, cyclamates (1969), Red Dye No. 2 (1976), saccharin (1977), Love Canal (1978), Times Beach (1982), Alar (1989), amalgam dental fillings (1990), and cellular phones (1993). The intent is to help consumers place health-scare claims in perspective. This report is available from ACSH (1995 Broadway, 2nd Floor, New York, NY 10023-5860) for $3.85.

Matthews, Robert. "Faith, Hope, and Statistics." *New Scientist*, November 22, 1997, pp. 36–39. Very interesting article on the use in science of Bayes's theorem instead of classical probability tests to better determine a more "significant" view of probabilities. The Bayesian approach, which incorporates subjective prior probabilities, avoids the experimenter's being trapped into attributing high probabilities to a statistical outcome that may in fact be due to flawed experiments or cheating, such as in an ESP test.

Scott, Eugenie C. "The Pope's Message on Evolution and Four Commentaries." *Quarterly Review of Biology*, 72 (4): 401–406, December 1997. Explores how Pope John Paul II's 1996 statement on evolution will affect the creation/evolution controversy in North America. Scott says the Pope's statement is welcome and the publicity given it should increase the number of Americans who accept evolution. But she calls on scientists, in a deeply religious America, to respect students' views and not, by their actions, give ammunition to the creationists' contention that evolution is a materialist philosophy rather than a science.

Skolnick, Andrew A. "Traditional Chinese Medicine Under Scrutiny." In *Britannica Medical and Health Annual 1998*, pp. 158–162. Article begins by placing traditional Chinese medicine into cultural and medical perspective, then reports on some more outlandish claims of traditional healers. Notes that TCM theories rest upon a foundation of essentially untestable supernatural precepts.

Zacks, Rebecca. "What Are They Thinking?" *Scientific American*, October 1997, p. 34. Short news item on students' reasons for rejecting evolution. Addressing students' false preconceptions about genetics, radiometric dating, and statistical probability is seen as a useful approach.

—Kendrick Frazier

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Bible-Code Developments

DAVID E. THOMAS

There have been several interesting developments in the Bible-code saga since my report "Hidden Messages and the Bible Code" in the November/December 1997 SKEPTICAL INQUIRER.

I have derived a formula for how many occurrences of given words you would expect to find in a text of a given number of random letters. One must calculate the probability of selection for each letter, which depends on the particular text being examined. This is just the number of occurrences of the letter divided by the total number of letters. Typically, the probability for getting an E is above 0.1, while that for a Q can be just 0.005. For a given word like "Roswell," you multiply the chances for an R with that for an O, then an S, and so on. The final product is multiplied by the total possible number of equidistant letter sequences for the word, which is roughly the square of the number of letters in the entire text divided by one less than the number of letters in the candidate hidden word.

This formula works quite well. I estimated that I would find 18.7 occurrences of "Clinton" in *War and Peace*, Book 1 (212,000 characters, 7.5 billion possible seven-letter equidistant sequences); the actual number was 21. I estimated I would find 128.1 matches for the name "Apollo"—and got 129. With each additional letter in candidate words, the chances fall, because you must multiply your product by another number invariably less than one. And rare letters reduce the expected matches greatly.

At a reporter's suggestion, I downloaded the chapter excerpt of Michael Drosnin's book, *The Bible Code*, from Simon and Schuster's Web site and began searching away. Even though the chapter was only about 4,000 characters in length, I was able to produce a number of hits. One puzzle held a lunar theme: "space," "lunar," "craft," and several "moon's," all authentic hidden words. I found the ubiquitous "Hitler/Nazi," even though the excerpt did not mention those words directly, talking instead mainly about the Rabin assassination. One puzzle has the hidden message "The code is a silly snake-oil hoax." And I even found "The code is evil" hidden in Drosnin's book (a mixed message he is sending us here).

Reporter Eric Zorn of the *Chicago Tribune* had me look for the name of a very recently disgraced Chicago alderman in Zorn's old editorials. Sure enough—the alderman's demise had been predicted years before. The Zorn Code was announced on October 27, 1997, in the *Tribune*.

Drosnin has been stumping Australia and the world, flattering code-buster Brendan McKay with compliments such as "clown," "liar," "fraud"; and me with, "Thomas appears not to understand the Bible Code at all." Drosnin accuses us of "counterfeiting" codes, even though McKay and I do not need to alter even one letter of various texts—either the puzzles are there, or they're not. (And to Drosnin's dismay, the puzzles continue to turn up *everywhere*). But Drosnin is also attacking us because our puzzles allegedly do not have "minimality." Not only must hidden words appear close together in a puzzle, they must also be the shortest skip distances for the given word in a fair-sized portion of the text. Drosnin only mentions minimality in passing, buried in the chapter notes at the end of his book: "All of the Bible code print-outs displayed in this book have been confirmed by statistics to be encoded beyond chance. The word combinations are mathematically proven to be non-random. . . . The computer scores the matches between words, using two tests—how closely they appear together, and whether the skips that spell out the search words are the shortest in the Bible. (For a more detailed explanation see Appendix.)"

Interestingly, some of Drosnin's own puzzles are not "minimal."

His match for "Clinton" has the largest step of all four "Clinton's" found

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in the Hebrew Torah, and the other three occur entirely within the chosen match. Each of these three serves to give the chosen "Clinton" a "domain of minimality" of zero. (In contrast, the close matches of "Hitler" and "Nazi" I found in Drosnin's own book are both minimal over the entire chapter, and the mention of "Roswell" I found in the King James Bible is minimal over the complete text of the Book of Genesis.)

I downloaded the Torah (Koren edition) from McKay's Web site, and modified my program to handle the Hebrew characters via the Michigan-Claremont transliteration scheme (in which, for example, the Hebrew letter "Shin" is represented as "$"). I have since reproduced a number of Drosnin's puzzles to the letter, including his nonminimal "Clinton/President" match. I also contrived a method for printing the puzzles out in the actual Hebrew characters. (Pretty good for someone who doesn't "understand the Bible Code at all.")

Amazingly, Drosnin found "Shoemaker-Levy" (transliterated as $WMKRLWY, eight characters), not in the five books of the Torah, but in Isaiah. Eliyahu Rips used Isaiah as a control, an example of an ancient Hebrew text without the "code," and found no unlikely codes therein. Drosnin also found "computer" in the book of Daniel. Perhaps he forgot that the code is supposed to occur only in the five books of Moses: Genesis, Exodus, Leviticus, Numbers, and Deuteronomy.

McKay is vigorously pursuing a response to the 1994 *Statistical Science* article by Rips et al. that gave the "code" its first big boost. Rips studied the Genesis "code" by finding names of post-Biblical rabbis linked to birth/death years, appellations (titles), etc. But using the very same rules restricting choices of names, appellations, and so forth, McKay was able to find an "impossible by chance" result—in the Hebrew text of *War and Peace*. Full details can be found on the Internet at http://cs.anu.edu.au/~bdm/dilugim/torah.html.

A new book written by Jeffrey Satinover has appeared, published by William Morrow. The book, called *Cracking the Bible Code*, strongly supports the code phenomenon. Interestingly, most of the true-blue code promoters despise Drosnin as the proverbial bull in the china shop—Satinover alludes to him, but won't even mention him by name.

In the September 1997 *Notices of the AMS* (American Mathematical Society), Harvard mathematics professor (and Orthodox rabbi) Shlomo Sternberg blasted the code phenomenon. In particular, he pointed out that the elaborate "codes" found by both Rips and Drosnin would collapse even if just a few letters were added to or dropped from the text they used.

And Sternberg notes, "but any serious student of the Talmud knows that there are many citations of the Hebrew Bible which indicate a differing text from the one we have. . . . One of the oldest complete texts of the Bible, the Leningrad codex (from 1009) (also available electronically) differs from the Koren version used by Rips and Witztum in forty-one places in Deuteronomy alone. In fact, the spelling in the Hebrew Bible did not become uniformized until the sixteenth century with the advent of a printed version that could provide an identical standard text available at diverse geographical locations."

The search for the truth about equidistant letter sequences goes on. One thing I am looking at is how "clumpiness" of letters in real texts sometimes produces many more or fewer matches than would be expected for a purely randomized text. I found one 934-letter chunk of a book about science by Isaac Asimov that produced an amazing seven matches for the word "Nazi," even though only one was expected. This result is apparently "beyond chance," with odds of at least two thousand to one against. But it is not really that surprising—the chunk of text happened to contain several instances of the word "generalization." And inside every instance, at a step of three, lurks a Nazi: *geNerAliZatIon*.

It looks like we have to be more careful about what we write! □

DAWKINS

from page 33

We can't read these messages yet. Maybe we never shall, for their language is indirect, as befits a recipe rather than a reversible blueprint. But it's still true that our DNA is a coded description of the worlds in which our ancestors survived. We are walking archives of the African Pliocene, even of Devonian seas, walking repositories of wisdom out of the old days. You could spend a lifetime reading such messages and die unsated by the wonder of it.

We are going to die, and that makes us the lucky ones. Most people are never going to die because they are never going to be born. The potential people who could have been standing in my place but who will never see the light of day outnumber the sand grains of Sahara—more, the atoms in the universe. Certainly those unborn ghosts include greater poets than Donne, greater scientists than Newton, greater composers than Beethoven. We know this because the set of possible people allowed by our DNA so massively outnumbers the set of actual people. In the teeth of these stupefying odds, it is you and I that are privileged to be here, privileged with eyes to see where we are and brains to wonder why.

There is an appetite for wonder, and isn't true science well qualified to feed it?

It's often said that people "need" something more in their lives than just the material world. There is a gap that must be filled. People need to feel a sense of purpose. Well, not a *bad* purpose would be to find out what is already here, in the material world, before concluding that you need something more. How much more do you want? Just study what is, and you'll find that it already is far more uplifting than anything you could imagine needing.

You don't have to be a scientist—you don't have to play the Bunsen burner—in order to understand enough science to overtake your imagined need and fill that fancied gap. Science needs to be released from the lab into the culture. □

Cutting Magic in Half: A Two-Edged Sword

EDWARD SUMMER

Skeptics have worked together with magicians to great advantage. Harry Houdini in his day and James Randi or India's B. Premanand in ours have performed a priceless service in exposing a range of tricksters. Yet, ironically, no magician worth his (or these days her) salt would willingly reveal his or her secrets, including the secrets involved in exposing psychic pretenders.

On November 24, 1997, Fox Television broadcast a one-hour program, "A Magician's Ultimate Betrayal: Magic's Biggest Secrets Finally Revealed," in which a masked performer "exposed" many of stage magic's sacred effects: cutting a woman in half, levitation, making an elephant disappear, and more. As a former stage magician, part of me was immediately outraged, but another part of me wonders just how bad this really was, and, indeed, if there wasn't something beneficial about the whole thing.

What is the "magic" that Houdini and Randi practice anyway? Well, it's certainly not the trash that passes for mentalism on the "Psychic Friends' Network" or in a fakir's show in rural India. But it is, clearly, all about illusions. "Stage magic" and "mentalism" are forms of theater. Doug Henning—one of the finest illusionists of our time before he gave it all up to work on the ever elusive Transcendental Meditation Theme Park—started his career with a Canadian government grant to research

Fox TV's "A Magician's Ultimate Betrayal: Magic's Biggest Secrets Finally Revealed." ©1997 Fox Broadcasting Company.

magic as a form of classical theater. In addition to his full-evening show presented in the classic nineteenth-century mold of Keller or Thurston, Henning was directly responsible for the Broadway musical *The Magic Show*, which contained classic illusions in a charming framework of songs and sentiment. This led to the recent revival of stage magic and served not only as a foundation for the late Harry Blackstone Jr. to relaunch his career, but also created a climate in which David Copperfield slowly but surely ascended to the top of his profession.

The irony is that an era in which stage magic is flourishing for the first time in decades is also a time in which a veritable litany of superstition has reentrenched itself in the popular mind as a form of "fact."

If people are confused by the apparent science of *The X-Files*, are they equally confused by stage magicians? The sell-out run of live performances by David Copperfield in New York City was largely attended by families. Children and parents were suitably baffled by Mr. Copperfield's performance. One suspects that there's an unspoken covenant between audience and magician: the magician does his best to "fool" the audience; the audience, in turn, agrees to be "baffled." The goal is awe, wonder, and entertainment. Doug Henning, in fact, has made it a point to explain in his show that he performs illusions: there is no pretense of "supernatural" happenings.

Although "psychic" networks post a "for entertainment only" disclaimer, the implied covenant here is that the "psychic" pretends (for the sake of the FCC) that he or she is "entertaining" the

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caller, but the caller understands that the psychic's "gifts" are genuine. Infomericals compel viewers to accept the "amazing" powers of these readers, keeping them telephoning at rates approaching $240 an hour! The top-priced ticket for David Copperfield's two-hour performance was under $100.

Is there a circumstance under which the "Magician's Code" should be broken? Fox Television apparently thought so. Can more be learned here than "how it was done"?

From time to time, people come forward and "expose" stage magic. Penn and Teller, the bad boys of modern magic, outraged magicians by exposing such classics as the "cups and balls" each and every evening to a packed house. Their intention, however, is an intriguing one: Explaining to the audience in advance that it *is* all a "trick," they proceed to totally fool the same audience. A splendid evening of entertainment becomes a cautionary model that serves as a useful seed of skepticism in day-today life. Penn, on occasion, delivers a mighty oration (and that certainly describes it perfectly) on the dangers of credulity when dealing with charlatans of all kinds.

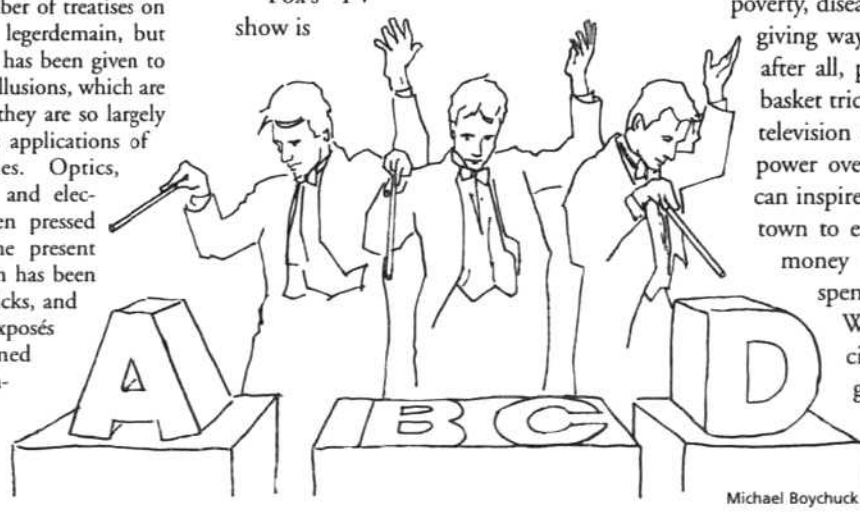
But is this something new? Not at all. In 1897 a book filled with blatant exposés appeared. Here is the opening paragraph of the preface:

> It is believed that the present work occupies a unique field in the extensive literature of magic. There are already a large number of treatises on natural magic and legerdemain, but very little attention has been given to the exposé of stage illusions, which are of great interest as they are so largely based on ingenious applications of scientific principles. Optics, mechanics, sound, and electricity have all been pressed into service. In the present work great attention has been paid to elaborate tricks, and in many cases the exposés have been obtained from the prestidigitateurs themselves. Many of the best illusions of Robert-Houdin, Herrmann, and Kellar will be found clearly explained.

Who published this terrible book? Lean closer. I'll whisper in your ear. It was *Scientific American*. This delicious tome is entitled *Magic, Stage Illusions and Scientific Diversion Including Trick Photography*. It contained four hundred illustrations which, in their detail, rival some of the Fox network's videography. Last reprinted in 1977, it exposes nearly every illusion that any professional magician of the day performed.

Exposé, apparently, was not such a dirty word at the turn of the century. It was de rigueur for Blackstone or Thurston to sell little books in the lobby that taught the eager fan a few card or coin tricks. Many readers may also remember fondly the magic books of Walter Gibson, a man who rivaled Isaac Asimov as the most prolific author of all times. Gibson, who for decades penned a novel a week that enthralled pulp-magazine readers with the florid adventures of "The Shadow," wrote exemplary "how-to" books of basic conjuring skills. In addition, nearly every major city houses a "magic shop" where the devotee can purchase the secret of just about any effect that tortures your brain.

Fox's TV show is only the latest in a long tradition. Aping the tone of tabloids, the creators of the show displayed a salacious lack of respect for the "art" of conjuring by acting as though they were exercising some sort of guaranteed freedom by revealing these "sneaky tricks." Penn and Teller do an "exposé" of an elaborate illusion with skill that provokes gasps and chortles of genuine delight in the audience. Not so, Fox. *Smarmy* is the word that leaps to mind. Kind of like finding out a guilty secret. Pity.



Michael Boychuck

Nonetheless, as members of a society that values (to some extent, certainly) rationality and freedom of expression, it is easy to forget other cultures that don't. India with its fakirs is the saddest and most frightening example, but tales of belief in witchcraft that result in the murder of old men and women still emerge from modern Africa. We have only to look back a few centuries at the Salem witch trials to see the pattern of ignorance and credulity that required so many years of tragedy and education to overcome. It is ironic, but perhaps not unexpected, that Doug Henning went from a fine career in entertainment to belief in a supposedly genuine form of "levitation." The culture that produced his "guru" is steeped in superstition and lacked, until recently, any mechanism to counteract the effects of centuries of belief in magic. Mr. Premanand's exemplary work in exposing the fake methods of Indian fakirs is finally beginning to make a difference. Thanks to his work, combined with other efforts at helping "ignorant" peoples to financial self-sufficiency, poverty, disease, and superstition are giving way to knowledge. Fakirs, after all, perform the sword and basket trick "exposed" on the Fox television show as proof of their power over life and death. They can inspire enough fear in a small town to extort large amounts of money that might better be spent on food or sanitation. While this television special might be an outrageous "spoiler" for Americans, in a small Bengali village such an exposé

requires the courage of a true patriot.

Some years ago, James Randi exposed both the Philippine psychic surgery racket and an American faith healer who used "mentalist" methods to bilk his desperately ill religious followers out of their money. What is appalling is that no television network at the time had the courage to expose a "religious figure." It remained for Johnny Carson, an amateur magician himself, to give Randi a venue to reveal these scams.

No one among my acquaintances enjoys stage magic or sleight of hand as much as I do, and, basically, I know how the performers do EVERYTHING! What delights me endlessly, is skill both in manipulation and in performance. It is knowing how it works that gives me the confidence to say that a trickster with alleged "special gifts" is, at best, a highly skilled sleight-of-hand artist. The difficulty of mastering some minuscule card manipulation skill has undoubtedly given me great respect for the meticulousness of genuine scientific research: Magic presents us only with fact A and fact D, doing its very best to conceal facts B and C—with the intention to entertain. But in science you can't get from A to D without going through steps B and C. No way. Once you know that, it is pretty hard to be fooled by fortunetellers or homeopaths.

Mind you, I'm still sitting here and gritting my teeth, but if Fox's "Magic's Biggest Secrets Revealed" demonstrated to even a few heretofore uninformed people that there is nothing supernatural in a magic show, then I'm willing to risk that the likes of David Copperfield will survive this violation and, further, that some clever minds will come up with new ways to try to fool me. Go on. Heh, heh. Try it!

Why the World Is Not My Idea . . . or George's

RALPH ESTLING

Dear George,

Thank you for your letter of the 11th. Yes, the fact that things exist is a bit of a problem. Still, your argument that existence is an enigma, inexplicable, is no reason to believe it's all a miracle. Since humans first evolved, they have found countless enigmas and inexplicable things that, over the centuries, have been explained, and always without the need for miracles. Miracles have certainly been invoked, but they were never really necessary. Why things exist, why there is something, a universe for example, rather than nothing, is a question that has been asked for many thousands of years. The philosopher Leibniz asked it and then gave an answer, but it slips my mind now what it was, though it had something to do with God. Enigmas and inexplicable questions still exist, but given time, research, and intelligent surmise, there's no reason to insist they never can be answered in a rational way. We've no cause to assume that, just because something is unanswerable right now, it will be eternally unanswerable. The history of the human race indicates very much the opposite. There is no need (except in ourselves perhaps) to fall back on the miraculous. This is what the history of human thought teaches us.

You have a funny idea of what hubris is. You claim that our minds create all that exists, we create reality by thinking, and when I deny this and say reality is already out there and doesn't need you or me or anyone to make it real, you say I show hubris. You're right, it's not possible to prove that the universe is not merely a figment of my imagination, or yours, or somebody else's. At least not while that person is alive. But if that person then dies, and the universe continues to exist, then I think we have a pretty good answer. So I'll make this contract with you: If the universe is my personal creation and I die before you and, as a result, the universe blinks out of existence and is never seen or heard of again, you've won. On the other hand, if you say the universe is a figment of *your* imagination and you die first and reality just goes on as if nothing has happened, then I win the bet.

Solipsism, like most forms of schizophrenia, can never be argued away; any resourceful schizophrenic can always maintain he can't be proven wrong. As a matter of fact, he can, quite easily. All you need do is beat the hell out of him and then ask why, if the world is his creation, he created it in such a way that he allows himself to have the hell beaten out of him. Or why does he have a toothache? Or piles? Or have all *kinds* of unpleasant things happen to him, such as getting locked up in an asylum? Of course, if your solipsist is also a masochist, you have a problem.

So I guess the best solution is to believe (until you have some good reason not to) that there *is* a physical universe out there, outside of our thoughts about it. Look at it this way: If the universe is *your* thought, *your* idea, *your* creation,

Ralph Estling writes from Ilminster, Somerset, U.K.

then why have you created such a disagreeable fellow as I to argue with you and upset you so? Seems pretty illogical, if you ask me. So, yes, I have thought over the possibility that the universe is merely somebody's idea, and I've come to the conclusion that the notion doesn't make much sense, even within its own frame of logic. Something which, even by its own internal rules of consistency, doesn't add up, is not to be given much credence, or much of our time. Our time is limited, and growing more limited by the hour. It's not to be wasted. Once it's finished, there won't be any more.

No, since you ask, I don't think that when all the data are in, we'll find that matter and spirit are the same thing. I'm reasonably sure that *mind* and matter are the same thing, that what we call mind is a manifestation of the functioning of the brain. But I'm reasonably sure that "All" is not "Mind." All is space, time, matter, and energy. True, without mind, nothing can be discerned. But that doesn't mean that nothing is there. It's like the old riddle: If a tree falls and there is no one around to hear it, does it make a sound? The answer is quite obvious: No, there's no sound, as sound is a product of waves of air hitting a tympanic membrane and then being transported to a brain. But there *are* sound waves. These are intrinsic and have nothing to do with our minds, so far as their existence goes. Existence exists; it doesn't need us as a crutch.

Hubris? Well, I'm quite sure that when I die, the universe will continue to go its merry way, just as if nothing had happened. After all, it's been going its merry way for fifteen billion years or so before I was born. Of course, I *could* argue, as Bertrand Russell did, that the universe came into existence five minutes ago, courtesy of my mind, complete with my dirty socks in the laundry hamper, and then challenge you, and everybody else, to prove me wrong. But, on reflection, I think I'll leave things as they are and just go on pretending that there really is reality out there that I can, if I want to, discern, and let it go at that.

Yes, there's no getting around the fact that I prefer reason (or what I take to be reason) to what I take to be nonsense. Still, I have to insist once again that no one can disprove a negative (you accuse me of not having "an iota of proof in the opposite direction"). Rational argument requires that the proposer of an idea produce evidence for the idea, not that the rest of the world produce evidence against it; although, of course, if others do happen to have evidence against it, that certainly helps hit it on the head. But this so-called negative evidence isn't required. I cannot prove that there *aren't* eleven purple and green leprechauns, totally invisible, totally inaudible, totally beyond any sensual experience, even that which is enhanced by machines, right here in my study, cavorting around completely beyond my range of perception. But reason leads me to believe that there aren't, and that the idea there *might* be, until proven otherwise, is extravagant, unnecessary, and not required.

And this is the best way I know of for separating sanity from insanity. Always assuming we want to.

Yours,
Ralph

INVESTIGATIVE FILES

from page 16

dows and draft effectively helped dispel what smoke there was. Finally, paranormalists wonder whether it was "normal" that the victim was not in pain—either at the time of the accident or subsequently (Heymer 1996, 187, 194). In fact, at the time of the fire, while she failed to cry out, she had "whimpered,"according to her father (Saffin 1982). Her mental condition, her body's production of endorphins (pain-reducing chemicals), the subsequent shock, and her eventual semi-conscious state may all have played a part in minimizing her response to pain.

A&E's *The Unexplained* series included the Saffin case in its hour-long discussion of SHC (September 18, 1997). My brief comments on the cases were included, and, overall, the presentation might have been considered balanced. Unfortunately, at the closing of the program the narrator spoke of "an acupuncturist with remarkable talents. Through meditation and practice, he had learned to harness the electrical currents in his body. . . ." Suiting action to words, the supposed marvel crumpled a newspaper which—with a wave of his hand (and a bit of editing to cover the delay)—burst into flames. Alas, it appears the producers were snookered by a well-known magic trick billed variously as the "Yogi's Gaze" (Miller 1978) and "fire by mental power" (Premanand 1994). Ironically, the feat depends on the secret combining of two chemicals that do, actually, spontaneously combust.

Acknowledgments

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Debunking the 'Bible Code'

David E. Thomas's exposé of *The Bible Code* by Michael Drosnin was very persuasive ("Hidden Messages and the Bible Code," November/December 1997). In fact, Thomas's examples of idiot messages obtained by using the same decoding method in the King James Version of the Bible involved a lot more effort than Drosnin's because Thomas's messages in English included all the vowels as well as the consonants. Drosnin's word games in Hebrew left out all the vowels, which enabled Drosnin to force upon his consonants an enormous variety of declensions and conjugations at his whim.

One prime example of Drosnin's methods is when he claims that "dinosaur" and "asteroid" appear in the Hebrew text. To find the letters for "dinosaur," Drosnin has to begin in the first half of Genesis and finish in the last half of Deuteronomy; in other words, this one word spans virtually the whole of the Pentateuch, with roughly thirty-eight pages (at roughly a thousand letters per page) of a printed Hebrew Bible between each letter in "dinosaur." And it's not even "dinosaur" as the word is spelled in the relatively few Hebrew dictionaries that have it; it's Drosnin's unique spelling, his own transliteration into Hebrew letters of the English word that didn't exist until 1841.

While we're at at it, the word he says is "asteroid" is really the very word used throughout the Hebrew Bible for "star." Similarly, when Drosnin says he found "Watergate" with his code, he didn't find the Hebrew name that appears repeatedly in Nehemiah, chapter 8; he found his own transliteration of the American hotel name. So Drosnin "finds" messages by torturing or even abandoning the Hebrew language.

One technical question not answered by Drosnin, nor by the sundry other authors touting their own Bible code messages, is the provenance of his computerized Hebrew text. The methodology of the Bible code dictates that even one letter added or dropped from the text could throw off most of the messages found (and cause different messages to appear). Moreover, Drosnin was using a Hebrew text that had been computerized, and the differences between that medium and print could add their own characteristics For example, the handful of traditional peculiars letters—raised, enlarged, shrunk, etc.—might be homogenized, and the multitude of traditional marginal notes might be incorporated into the main text where they'd be included in the letter counts. And, of course, there is the question of how carefully the computerized version was proofread and edited. Drosnin mentions two leading editions—the Koren Hebrew Bible published in Jerusalem in the 1960s and distinguished for its elegant typesetting (although its text is mostly dependent on an edition by Heidenheim a century earlier) and the Leningrad Code, the world's oldest dated complete Hebrew Bible manuscript, which is the basis of the text of the *Biblia Hebraica Stuttgartensia* and the pocket Bibles distributed by the Israeli Army. But Drosnin doesn't say that he actually used either one (the Leningrad text is more likely to be available in computer format).

Drosnin also says that he had found messages in the Books of Isaiah and Daniel and that these messages had been hidden three thousand years ago. You don't have to be a skeptical inquirer to reject this claim: Even the most unscientific literalistic Fundamentalist knows that neither Isaiah nor Daniel lived as much as three thousand years ago.

Bernard J. Sussman,
J.D., M.L.S., C.P.
Bethesda, Md.

I thoroughly enjoyed David Thomas's article on the Bible-code phenomenon. Wouldn't it be fascinating to apply his message-searching programs to texts of biblical length consisting of a random sequence of letters? If useful, the random text could be biased to include the proper letter frequencies found in English.

It would also be interesting to apply his programs to text derived from genetic sequences. (Although genetic sequences are represented with the symbols G, C, A and T, it is possible to develop codes that map the symbols to twenty-six letters of the alphabet.)

Finally, it would be fascinating to create an artificial manuscript in such a way that it encodes a complete message that appears astounding, such as, "The CIA killed Kennedy." In fact, perhaps someone is already thinking of doing this to get on *Oprah*! The secret manuscript could be "discovered," and the secret messages revealed.

Clifford A. Pickover
IBM Thomas J. Watson
Research Center
Yorktown Heights, N.Y.

Einstein's god, as everyone has heard, is *raffiniert* (cunning) but not *böse* (mean). Drosnin's god violates both of these terms. An omniscient agent would surely come up with a more sophisticated code—actually it's a cipher—than the hoary "Caesar's alphabet" substitution that Drosnin presents us with and has misapplied. In practice, the key to a cipher derives from the text itself and not from the fiat of the decipherer. There is also the question of the ratio of plain text to its "enciphered" information. Is it efficient to use hundreds of pages to get two or three words? On behalf of Einstein's god, I protest these indignities. I myself vote for the book of nature, the traditional text for "argument from design" hermeneutics.

As for Einstein's second point, the "plain text" of the Scriptures is enigmatic enough to have obsessed millennia of exegetes. There is an *embarrass des mysteres* already and no justification to posit more. The question of messages that need a computer to access them calls into question not only the character of Drosnin's god—his chosen people are apparently computer nerds—but also his planning. The 1963 assassination of Kennedy took place before the widespread availability of computers.

But granting, for the sake of argument, a message in cipher, just what sort of information might it usefully provide? Drosnin's god shows a Democratic bias in selecting assassinations. Why not "Lincoln, Booth, Ford Theater" or even "Ronald Reagan, watch out"?

It would seem, however, that what's gleaned should fit the nature of the plain text. That the Bible should contain a cryptic litany of the mishaps of twentieth-century politicos but not say anything about its own central dilemma is absurd on the face of it. In the context, something like "Jesus saves!" or alternately "Jesus is not the messiah" would be more to the

point. But such a message would stir up the wrong kind of controversy: it wouldn't sell books. Good work!

Bob Robinson
rgriii@hotmail.com

I heard Michael Drosnin, author of *The Bible Code*, speak on the *Dianne Rehm Show* on NPR recently and I was very skeptical of all but his most mundane claims. I was, therefore, very pleased to read David Thomas's article confronting those claims head-on.

What surprised me the most about Drosnin's appearance on NPR was his claim that not only were actual future events predicted in the Hebrew Bible thousands of years ago (e.g., the assassination of Prime Minister Rabin), but *all possible future events* as well! Thus, if you were to find "Clinton" crossed with "assassin assassinates" that might mean that President Clinton was going to be assassinated, or possibly that some other person named Clinton was going to be assassinated; or it might mean nothing at all. If that is indeed the case, then of what possible use are these "predictions"? If any of them might or might not be true than how do the "predictions" in the Hebrew Bible imply a god, some other "higher power," or that "we are not alone"? Of course, the whole debate becomes moot once you begin to find similar "predictions" in the KJV of Genesis and in *Edwards v. Aguillard*, which Drosnin assured NPR listeners were not there!

Thanks again for a great magazine, and keep up the good work!

Stanley J. Alluisi
Choctaw, Okla.

David E. Thomas did an outstanding job of debunking this Bible-code nonsense. However, I am afraid that some of my fellow evangelicals such as Grant R. Jeffrey have embraced *The Bible Code*, and they will not pay attention to this fine article, since it was written by a skeptic. Therefore, I wrote Mr. Jeffrey myself and attempted to convince him that there are many reasons to doubt the results of this research by Eliyahu Rips. Hopefully Jeffrey will pay attention, since he knows that I do not disagree with him theologically.

I also pointed out to Jeffrey that many evangelicals are not convinced at all by the evidence presented in *The Bible Code*. For instance, Hank Hanegraaff noted in the September/October 1997 *Christian Research Report* that May Lou Nielsen, manager of For Heaven's Sake bookstore in Longmont, Colorado, stated, "I had one customer who wanted to order 100 copies of *The Bible Code*. I told him there are serious flaws with ELS (Equidistant Letter Sequencing). I hate to sacrifice the sales but I also want to have integrity in what I sell."

I wish I could recommend *The Signature of God: Astonishing Biblical Discoveries* by Grant R. Jeffrey, but I disagree with the chapter that deals with ELS. Evidently Jeffrey was guilty of being overzealous, and the result was that his spiritual discernment suffered. Jesus does not want his followers to be gullible but sensible and prudent. He instructs them, "Lo, I am sending you out as sheep in the midst of wolves; be wary and wise as serpents, and be innocent—harmless, guileless and without falsity—as doves" (Matthew 10:16, Amplified Bible). I am glad that the falsity of *The Bible Code* has been exposed, but it saddens me that Jeffrey has to some degree hurt the reputation of evangelicals because he claimed it was the "Signature of God."

Everette Hatcher III
Little Rock, Ark.

If God, or whoever, had coded some important messages in the Bible, how come they all refer to the second half of this century? Were there no noteworthy persons in the few thousands of years before Clinton? Take a few: Caligula, Caesar, Vercingetorix, Attila, Montezuma, Columbus, Marco Polo, Cromwell, Washington, Napoleon, Darwin, Gandhi. . . . This clearly shows (apart from the basic fallacy of the hidden code) how narrow a horizon Drosnin has in dealing with a unique historical document.

Lassi Hyvarinen
Divonne les Bains, France

I wish the soundly conceived and clearly presented material in David E. Thomas's "Hidden Messages and the Bible Code" could be made available to a wider audience. I enjoy sharing with friends and my children how mathematically literate thinking can reveal deception. . . .

Glenn Matteson
San Luis Obispo, Calif.

For an update on Bible-code developments, see Dave Thomas's Follow-up column in this issue, page 57.

Science, Antiscience, and Preposterism

Kudos to you for publishing Susan Haack's brilliant piece "Science, Scientism, and Anti-Science in the Age of Preposterism" (November/December 1997). I have long thought your purposes would be better served with fewer articles on UFOs, psychics, etc., and more on just what constitutes correct reasoning and sound inquiry.

Really now, do UFO-abduction proponents or Uri Gellers who claim to be able to bend keys with their minds really pose much of a threat to higher education or the body politic? Or is the real problem at a more basic level? If Professor Haack is right, the most insidious forms of irrationalism now come from within the walls of *academe* itself, in terms of its basic structure, much of its content, and the kind of people it rewards and promotes. A considerable body of evidence supports her views (see, for example, Gross and Levitt's *Higher Superstition: The Academic Left and Its Quarrels with Science*).

While there is little difference, cognitively speaking, between UFO cults and the brands of nonsense floated by many so-called "feminist philosophers" or "feminist critics of science," the latter clearly *are* a threat. With rare exceptions, such as John Mack, the UFO-abduction people do not have tenured positions at prestigious universities; they do not sit on hiring or tenure and promotion committees, or on governing boards; they do not have the ears of powerful people in government. In other words, the UFO-abduction believers do not have institutional power and support, while "feminist critics of science" do.

Open opposition to the latter's agenda for one's university can derail one's academic career. I learned this the hard way!

Today, people opposed to academic affirmative action and to the brands of irrationalism represented by radical feminism, multiculturalism, and the like, are simply being written out of intellectual professions. As a result, the new academic irrationalism increases, academic quality control diminishes as sound reasoning and scholarship are neither taught nor practiced, public scientific illiteracy grows, and books about UFO-abductions, psychics, and New Age rubbish continue to proliferate. The two are not unrelated.

Steven Yates, Ph.D.
Columbia, S.C.

Susan Haack's "Science, Scientism, and Anti-Science . . ." was an excellent summary of the increasingly widespread growth of academic flim-flam and cultural "know-nothingness." Many of us have been aware of this growth of "preposterism" and have sounded-off concerning the same.

But—what can we do about it and how can we turn the tide? Certainly, publications such as the SKEPTICAL INQUIRER and organizations such as CSICOP are helpful. Are they sufficient? How else and in what other ways can we seekers for intellectual honesty work toward overcoming the advocates of "preposterism" (Haack's term for an environment of academic flim-flam, with its cultural and *pari passu* accompaniments)?

I welcome another article by Haack or by an equivalent truth-seeker, to guide us in the above task.

Leo Shatin, Ph.D.
Retired Prof. Clin. Psych.
Boca Raton, Fla.

In her elegant but biting critique of the "Age of Preposterism," Susan Haack provides an excellent example of a mature skeptical inquiry. One might expect this in a magazine called SKEPTICAL INQUIRER, but, alas, it is very rare. My only objection is this: Dr. Haack is too harsh on her sisters in the humanities and too kind to her brothers in the sciences.

Preposterism equally affects all subsets of the present population of academia without regard to discipline, gender, ethnicity, or ideology. Preposterism is an example of Gresham's Law: Bad money drives out good. The current intellectual coinage of academia has been debased by the bad accounting system used for tenure and other academic perks. This thoughtful and innovative paper on preposterism would get the same weight as the trivial rehashes of the doctrines favored by in-groups that are published in the journals controlled by those in-groups.

Nowadays, the highly fractionated journals of scientific specialties and subspecialties are also likely to be controlled by in-groups with pet doctrines or topics. Since the underlying processes of selection are similar for sciences and humanities, the quality of the papers is similar. The traditional processes of quality control in the sciences have been debased by preposterism. This is why the papers published nowadays in many scientific and technical journals are likely to be just as preposterous as papers published in the journals of the humanities.

Scientists have a very hard time, however, being skeptical about themselves.

Irwin D. Bross, Ph.D.
President, Biomedical
Metatechnology Inc.
Amherst, N.Y.

Edwin McMillan Co-Discovered Plutonium

I feel compelled to make a comment about the interview with Glenn Seaborg in the November/December 1997 SKEPTICAL INQUIRER. The introduction states that Seaborg discovered plutonium and co-discovered nine other elements. Actually, he co-discovered plutonium, along with Edwin McMillan, who shared the 1951 Nobel Prize in chemistry with Seaborg for this work.

The story goes like this: McMillan discovered neptunium and isolated it, postulated the existence of plutonium, and began to work to isolate it as well. He named the element he had isolated neptunium and set aside the name plutonium for the second element that he was working on. McMillan had made some progress when he was asked by the U.S. government to leave Berkeley, where he was working on this experiment, to go to the East Coast to work on radar. He left and the work stopped until Seaborg wrote to McMillan and asked if he could continue work on isolating the second transuranium element. McMillan gave his permission, and Seaborg and his team went on with the work, ultimately isolating plutonium.

For some reason, McMillan's part in this work has begun to disappear from the history of events that occurred in the late 1930s at Berkeley. It is very important to me that the record be set straight. I am his daughter.

Ann McMillan Chaikin
arvann@pacificrim.net

Ann McMillan Chaikin is entirely correct. For plutonium, we should have said "co-discovered (with Edwin McMillan). . . ." We appreciate her efforts to keep the record straight.

—Kendrick Frazier, Editor

'Contact' and 'Men in Black'

I agree entirely with Edward Summer's assessment of the film *Contact* as a plausible, nuanced portrayal of both science inspired by emotion and emotion tempered by science ("*Men in Black* and *Contact*: Night and Day," November/December). It's also an apt valedictory for Carl Sagan, who, despite his skepticism, always implied a craving for some sort of faith. Perhaps that's why he remains beloved not only by his fellow scientists by also by the public at large.

Although, as an inveterate atheist, I believe that nothing is mystical, I believe also that some things are of mystifical signifiance; this, after all, is what art is about. The danger lies in claiming objective reality for these potent but illusory feelings; this, unfortunately, is what religion is about. Our challenge is not to deny our feelings but to keep them in proper perspective; this, happily, is what *Contact* is about.

N. C. Jones
Wincester, Va.

I enjoyed Edward Summer's review of *Contact*; however, I was disappointed that he was so dismissive of *Men in Black*. In its own way, I think that *Men in Black* can do every bit as much as *Contact* to promote critical thinking.

The premise of *Men in Black* is that everything printed in the supermarket tabloid newspapers is true. Space aliens, government conspiracies, secret organizations, suppressed technologies, doomsday scenarios—everything. This premise leads naturally to some questions.

Who are these conspirators? How are they recruited? Where do they work? Who pays them? Do their families know? Any why haven't the neighbors noticed?

Who invents these suppressed technologies? Who suppresses them? Who uses them? Who makes money from them? How much? Any why haven't the neighbors noticed?

Who are these aliens? Where are they from? Why are they here? Where are their spaceships? Where do they land? Any why haven't the neighbors noticed?

Men in Black weaves a consistent—fantastic, but consistent—story that answers all these questions. If, upon reflection, you don't find this story entirely credible—congratulations! You're thinking critically!

If you don't believe this story, perhaps you'd like to make up one of your own. Anyone can make up a story. It just has to be internally consistent and account for all the observed facts—in this case, everything printed in the tabloid press.

Be forewarned that once you've rejected one story because it didn't stand up to critical scrutiny, you may find it difficult to accept other stories uncritically. You may find it difficult to accept all the facts as reported in the tabloid press. You may find yourself thinking critically about matters besides space aliens and government conspiracies. Critical thinking is like that: it won't stay in its box.

Men in Black is entertainment, in the best big-budget, high-intensity Hollywood style. But the same intensity that entertains viewers also confronts viewers—in a very visceral way—with the implications of their beliefs. And that is the genesis of critical thought.

Steven McDougall
Littleton, Mass.

Wait just a minute. I'm just as demanding, critical, and skeptical about extraterrestrial visitations as the best of 'em, but I hope I never get as uptight as Edward Summer, who can't recognize a great spoof like *Men in Black* and who gets all gushy about the sappy melodrama *Contact*. The latter is just as full of scientific implausibilities as the first, but is more misleading to the nontechnically minded public, because of its air of authenticity.

And by the way, wouldn't Summer's interpretation of the movie require that the relativistic time-dilation effect result in more time passing for those left on Earth than for the Jodie Foster/Ellie Arroway (Jill Tarter?) hyper-warp-speed intergalactic-traveling heroine?

Roger Arno
Saratoga, Calif.

In your recent review of the movie *Contact*, the statement was made that "because of general relativity, the eighteen-hour trip appears to have taken only forty-odd seconds here on Earth."

This statement has it backwards. The time on Earth would have been much longer than the eighteen hours on the ship.

Carl Sagan must have had something much more subtle in mind.

Einar Young
Largo, Fla.

Amazing Connections

It's a conspiracy.

I'm talking about the amazing connection between several of the articles that appeared in the November/December SKEPTICAL INQUIRER. Such a connection cannot be an accident; it must have been a plan. Right?

The articles I am referring to are: "Intelligent Design and Phillip Johnson" by Martin Gardner, "Hidden Messages and the Bible Code" by David E. Thomas, and "Science, Scientism, and Anti-Science in the Age of Preposterism" by Susan Haack.

Really, of course the connection is neither deliberate nor coincidental, but rather fundamental to the enterprise of rational, skeptical inquiry itself. It is the way in which different people deal with meaningful patterns discovered in random information. For a rational "skeptic," such patterns are like shapes in the clouds, interesting and meaningless. For a "true believer," such patterns are clear evidence of design and control.

The treatment of patterns within the random offers a real problem. It is clear that the nature of the empirical evidence is irrelevant. The exact same information—from Bible codes to faces on Mars—can be used in support of both points of view.

Skeptical inquiry is a noble and valuable service, but what really needs to be addressed is the basic thinking about random events and processes, something that even scientists such as Einstein have had trouble dealing with, but which is absolutely fundamental to understanding and accepting modern science in so many fields. Quantum theory, chaos and complexity theory, and evolution by natural selection all depend on random, stochastic processes.

For so many people, any kind of uncertainty is threatening and dangerous, and cannot be allowed. That attitude is the true target of the skeptic, the rational, and the creative.

C. David Noziglia
Watch Officer
Operations Center D/O
USIA Washington, D.C.

Gardner and 'Intelligent Design'

In his otherwise wonderful discussion of "intelligent designers," and of Phillip Johnson in particular, Martin Gardner ("Intelligent Design and Phillip Johnson," November/December) remarks, "Darwin was a Lamarckian who accepted the now-abandoned notion of the inheritance of acquired traits" (p. 17). The remark is a bit misleading, since it suggests that Darwin thought that inheritance of acquired traits was the only, or at least the major, source of variability in biological organisms. While it is true that Darwin accepted a role for the inheritance of acquired traits, he tended to downplay its significance, as

well as the significance of other sources of variability, in favor of the much more sophisticated and modern-sounding view that variability is due to the indirect effects of the environment on the reproductive organs. . . .

Although I have long been a fan of Gardner, I have often been perplexed by his descriptions of his religious beliefs. At one point in his essay (p. 19), Gardner undertakes to address Johnson's question about "how [Gardner] can hold a 'naturalistic worldview' and at the same time profess a belief in God." Gardner begins by saying that he "believe[s], by an emotional leap of faith, in a 'wholly other' deity, utterly inscrutable to our little finite minds." But this sounds like the kind of empty mysticism, the kind of theology of ignorance, that Hume lampoons in the *Dialogues Concerning Natural Religion*: it seems to involve nothing but a confession of ignorance, with the term *God* functioning to refer to whatever it is that we do not yet understand about the universe. That it is intended as such is suggested by Gardner's next sentence: "I believe there are truths as far beyond our grasp as calculus is beyond the grasp of a cat." I am sure that Gardner is right about this, but it seems a bit misleading to use the term *God* to refer to whatever it is we don't yet understand. Wouldn't it be clearer just to call it, well, "what we don't yet understand"?

Gregory Brown
Professor of Philosophy
University of Houston
Houston, Tex.

Martin Gardner's article on intelligent design and Phillip Johnson raises other issues the ID advocates must explain: Where did the Intelligent Designer come from? Was it created abruptly by some greater Designer, and if so, where did that greater Designer come from (etc., ad infinitum)? If the Designer evolved from some lower form, that form still needs either to have been created or to have developed through some random physical process? If the Designer's lower form was created, what created it (etc., ad infinitum), and if it came about through random processes, then why could not Earth's life forms have developed the same way without an Intelligent Designer?

ID believers will contradict themselves if they claim that a vastly powerful, tremendously intelligent Designer appeared spontaneously from a universal vacuum, yet deny that the rich chemical soup of early Earth's ocean could have produced the very simple life forms known to have existed more than three billion years ago. What mechanism do the ID believers propose spontaneously created their Designer?

ID claims also imply one Designer. Why not multiple Designers? If ID believers don't know what mechanism created their Designer, they can't possibly know if the mechanism created only one and then shut itself off. Their Designer-making machine may well have spawned trillions of Designers. For all we know, Designers are being manufactured even now. Given the many twists and turns that evolution has taken, the concept that multiple Designers are at work on Earth makes more sense than the concept of a single Designer who keeps botching experiments.

Compared to the gaping holes in intelligent design theory, the disputes among evolutionists are quite trivial. I must sign off now so I can go put a Darwin fish sticker on my car.

William Sierichs Jr.
Baton Rouge, La.

Intelligent design seems to me to be an oxymoron in philosophical thinking—"nature is so wonderful that it must be supernatural." Various philosophers and writers have for centuries limited their thinking with the "God only knows" conclusion when challenged by the current state of knowledge and understanding. It appears that for a large part of our society, the Age of Reason has come and gone. One can conclude, after observing worldwide current events, including the Middle East, Northern Ireland, and what were the USSR and Yugoslavia, that we are still in the Dark Ages of human relations and the willingness and ability to reason. Belief in the supernatural is so deeply rooted in human society that many scientists just can't cut the umbilical cord, regardless of evidence, lack of evidence, or reasoning ability. Our understanding of evolution and the big bang is based on limited knowledge that will certainly expand greatly in the future.

If one concludes, because of the wondrous complexity of the universe, that there was "intelligent design," then there must have been an Intelligent Designer. And if that's the case, the Designer was even more wondrous, and, therefore, there must have been an even more intelligent Designer to create the first Designer, and so on. The logic is reminiscent of the lady who claimed, "It's turtles all the way down."

Harold E. Rohlik
Brunswick Hills, Ohio

Dissonant 'Tin' of Astrology

"Tin brains!" I had to laugh with Martin Gardner's characterization of believers in astrology. In this, his response to a pro-astrology author who charged him with having a "tin ear" for not appreciating the "music" of astrology, Gardner may be accurate ("*Life* Magazine's Star-Struck View of Astrology," November/December). I read the same July 1997 *Life* cover feature, "Astrology Rising," and I had both a similar and different reaction. It was similar in that I had studied various forms of astrology in the early 1980s and found them all reality-challenged or just plain dumb; different, because Gardner reacts to the effects of magical thinking (it is not scientific) without explaining why it exists. I can understand why many skeptics are quick to dismiss irrational claims and why they feel that a good background in scientific philosophy might cure these "tin brains." I can also sympathize with Kenneth Miller, the naive author of the *Life* article, as I too felt the pull of certainty in the magical arts, once upon a time.

This incredible urge to see reality, especially self-reality, in the charismatic if absurd information reflected through divinitory means, has influenced human consciousness more or less in every age and culture. Gamblers feel this same urge based on a hunch or intuition that grasps the truth from a nonrational, supersensi-

ble world. I think magical thinkers like to compare this intuitive accuracy with the "aha" feeling that any scientist, artist, architect, or creative person experiences when a solution appears after an intense, concentrated struggle. Magical thinkers merely wish to get to truth or the "aha" without rational struggle.

When Miller was so taken with the slick, confident readings of his horoscope, he fell prey to this same urge to interact with a superhuman knowledge of reality. The bait was his "self" as he confused his desire to know himself with a clever device that was designed to suggest a self. What he wanted to deny is that that same device, his horoscope, fits most anyone else who could be convinced that it is his or her astrological chart. Once he converted into a believer due to his "experience" of truth, his urge was to accept rather than analyze. It is always more comforting to view oneself as a superior person who who attains a special knowledge than as a dupe.

When Miller consulted Ray Hyman about his experience, Hyman essentially shredded it by explaining how we deceive ourselves. Miller was trapped as he had to acknowledge Hyman's criticisms, but he had a choice. What interests me is Miller's rebound into credulity after going back for more astrological readings. Miller became another victim of *cognitive dissonance*—the condition of conflict that results when a strongly held and acted-on belief is disconfirmed. When this occurs, the person will more than likely seek to justify the belief rather than change his or her mind. . . .

Miller's article demonstrates cognitive dissonance at work. He found a way to plug astrology into a category he enjoyed, namely music, a place that seems to keep his belief out of the reach of rational inquiry. The dissonance after Hyman's critique created a potentially painful situation for Miller. He could not believe that he may have been wrong in his "positive" experience with astrology. That would put his intelligence, his will, and perhaps his very identity (horoscopes are about self-recognition) in jeopardy. Miller's "brain" was certainly dissonant, if not "tin." Perhaps this proves only that some people with fragile self-identities will accept anything, even an identity from astrology. The dramatic rise of belief in astrology in America and other Western nations as reported in *Life* may be an indicator as to just how fragile we are. It may also be an indicator of how accessible astrology has become.

Joe Szimhart
Pottstown, Pa.

Mars Effect Put to Rest

Your November/December 1997 issue states that the Mars effect has now been put to rest. Michel Gauquelin proposed in 1955 that more athletic champions (22 percent) are born when Mars occupies certain positions in the sky than can be expected from chance (17 percent), which, if true, would have vindicated astrology. Proponents and opponents agreed that the alleged Mars effect had the potential to be scientific proof of astrology, but were Gauquelin's figures correct? Today, forty years and three meticulous studies later, it appears that the Mars effect has everything to do with Gauquelin's biased data and nothing at all with the Red Planet or reality. It is laudable that some busy people took time off to refute the Mars effect idiocy, but was it worth the effort?

Why did Gauquelin ever think of a Mars effect? The 5 percent advantage it purportedly gives to athletes does not stand out from everyday observations. Why look for it if not to prove the validity of astrology? Which leads me to wonder whether Gauquelin first delved into possible correlations between the position of Venus and proneness to prostitution, or the phases of the moon and lunacy or Alzheimer's disease, or Saturn's rising and a penchant for debauchery; and only after finding that none of these worked, did he turn to Mars?

J. Azad
Calgary, Canada

Disturbing Circles

Thank you for publishing Ralph Estling's Forum column "Disturbing Circles." The debunking of Copernicus and Galileo is long overdue. They didn't prove the heliocentric theory. They put the Sun in the center for philosophical reasons, not scientific ones. Kepler and Newton, and Huygens's reflecting telescope, deserve the credit for proving that the Sun is in the center of the planetary system, not Copernicus and Galileo. Many historians, including Stephen Hawking and Jacob Bronowski, have told this story wrong.

Andrew O. Lutes
Mansfield, Ohio

In-Depth Investigations?

The article "Illusions of Authenticity" in your November/December issue reminded me of a newspaper interview I once conducted with a UFO "investigator."

He was a true believer in Roswell and other oddities and claimed he investigated UFO reports in northeast West Virginia for MUFON. Seems he was then checking into the tale of a UFO that had hovered over a tree outside a trailer, causing the inhabitants to look out and see it because their TV reception was messed up. They were good country people who had no reason to concoct a hoax, he said.

I drove by the place, which was located between Martinsburg and Shepherdstown. It wasn't in a remote area. There were neighbors and a much-used road nearby. Afterwards, I asked the "investigator" if he had questioned the neighbors about the alleged sighting.

He looked at me in amazement. "Why, no," he answered. "If I knocked on someone's door and asked if they'd seen a UFO, they'd think I was crazy!"

I suspect this is the kind of "in-depth investigation" that is all too often done by UFO enthusiasts.

John Douglas
Berkeley Springs, W. Va.

The letters column is a forum for views on the matters raised in previous issues. Letters should be no more than 225 words. Due to the volume of letters, not all can be published. They should be typed double-spaced. Address: Letters to the Editor, SKEPTICAL INQUIRER, 944 Deer Dr. NE, Albuquerque, NM 87122.

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The Committee for the Scientific Investigation of Claims of the Paranormal encourages the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and disseminates factual information about the results of such inquiries to the scientific community, the media, and the public. It also promotes science and scientific inquiry, critical thinking, science education, and the use of reason in examining important issues. To carry out these objectives the Committee:

- Sponsors publications
- Conducts public outreach efforts
- Maintains an international network of people and groups interested in critically examining paranormal, fringe-science, and other claims, and in contributing to consumer education
- Encourages research by objective and impartial inquiry in areas where it is needed
- Convenes conferences and meetings
- Conducts educational programs at all age levels
- Does not reject claims on a priori grounds, antecedent to inquiry, but examines them objectively and carefully

The Committee is a nonprofit scientific and educational organization.
The SKEPTICAL INQUIRER is its official journal.

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